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JOURNAL OF

THE TRANSACTIONS

OF

The Victoria Institute,

OR

Philosophical Society of Great Britain.

EDITED BY THE HONORARY SECRETARY,
CAPTAIN F. W. H. PETRIE, F.R.S.L., &c.

VOL XVI.

LONDON:
(Published for the Institute)
E. STANFORD, 55, CHARING CROSS, S.W.
EDINBURGH: R. GRANT & SON. DUBLIN: G. HERBERT.
PARIS: GALIGNANI & CO.
AUSTRALIA: G. ROBERTSON.
1883.

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BRITISH MUSEUM NATURAL HISTORY.

WYMAN AND SONS, PRINTERS,
GREAT QUEEN-STREET, LINCOLN'S-INN FIELDS,
LONDON, W.C.

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PREFACE.

THE Sixteenth Volume of the *Journal of the Transactions* of the VICTORIA INSTITUTE is now issued. It contains papers by the following authors:—Professor LIONEL S. BEALE, F.R.S., criticises the doctrine now entertained and widely taught by some scientific authorities—that life is, after all, only a form or mode of ordinary energy or motion. His purpose appears to be to show that this doctrine cannot be sustained by facts or arguments, observation or experiment, but rests on assertion only; while he holds that the views concerning the nature and origin of life, comprised in the *Evolution hypothesis*, are not scientifically tenable. In a second paper his aim is to show that the "New Materialism" is unscientific and opposed to reason, contradicted by many facts of nature, and injurious to the progress of Truth. Mr. T. K. CALLARD, F.G.S., and Mr. N. WHITLEY, C.E., contribute interesting Geological papers. The Rev. W. D. GROUND gives two careful papers on Mr. Herbert Spencer's philosophy. Mr. J. HASSELL examines the grounds of Haeckel's more extreme theory of Evolution. Mr. J. E. HOWARD, F.R.S., gives a paper on "the Supernatural in Nature." The Right Honourable the Lord O'NEILL ably deals with the question of the Credibility of the Supernatural;

his paper is supplemented by the last contribution to Science penned by the late well-known Rev. T. ROMNEY ROBINSON, D.D., F.R.S., F.R.A.S. Judge C. W. RICHMOND (New Zealand) adds a clearly-argued paper on "Materialism." The Rev. H. G. TOMKINS gives a paper "on Biblical proper Names, personal and local, illustrated from sources external to Holy Scripture"; his statements being well supported by Professor MASPERO, Mr. HORMUZD RASSAM, Mr. TRELAWNEY SAUNDERS, and others. To these, and to others who have taken part in the discussion of the subjects treated, the best thanks of the Members and Associates are due.

Her Majesty the Queen, in consequence of a communication from the President, has been graciously pleased to accept the volumes of the Transactions of the Institute. It is hoped that ere long Her Majesty may be pleased to accept that position designed for her by the founders of the Institute (*see* Vol. I., p. 31).

Amongst the names of members recently joined is that of Professor L. PASTEUR, F.R.S. The adhesion of such men as PASTEUR and WURTZ, and many others at home and abroad, has greatly tended to render the Institute more powerful for good, especially "at a time when principles which a few years ago would have been taken for granted by ninety-nine out of every hundred persons, are now all of a sudden brought up for discussion, and doubt thrown upon them" (Speech by Sir STAFFORD NORTHCOTE, Bart., M.P.), and when the active investigations of scientific men render it so important that *accurate* scientific research should be encouraged and insisted upon.

As instances of the important results of recent exploration, the excavations at Tell El-Maskhûtah in Egypt—bringing to light the Succoth of the Exodus—and the labours of the *Palestine Exploration Fund* in Moab, may be mentioned; also the remarkable discovery of the site of Sepharvaim by a member of the Institute, Mr. Hormuzd Rassam.

It is impossible to conclude without giving some expression to the wide-spread regret that progress in both the last-named promising fields of discovery is completely stopped for the present, by reason of our Government being unable to obtain those *Firmans* from the Porte which are necessary for the continuance of works so well begun.

F. W. H. PETRIE,
Hon. Secretary and Editor.

December 31, 1882.

THE
JOURNAL OF THE TRANSACTIONS
OF THE
VICTORIA INSTITUTE,
OR
PHILOSOPHICAL SOCIETY OF GREAT BRITAIN.

ANNUAL GENERAL MEETING,

HELD AT THE HOUSE OF THE SOCIETY OF ARTS,
THURSDAY, JUNE 30th, 1881.

THE RIGHT HON. THE EARL OF SHAFTESBURY, K.G., IN THE CHAIR.

The HON. SECRETARY, Capt. F. PETRIE, read the following Report:—

Progress of the Institute.

1. IN presenting the FIFTEENTH ANNUAL REPORT, the Council desires to congratulate the members and associates on the continued progress of the Institute, especially abroad;* this is due, in no small degree, to the increasing personal interest taken in its welfare by its supporters, and has enabled it, in spite of those adverse influences which have affected every interest, to increase its area of usefulness at a time when it was especially needful to do so.

The Institute's steady progress has led to the adherence of several scientific men of the first rank, who are now joining in its work. The importance of this fact cannot be over-estimated, as the Institute's power to accomplish its objects, and the respect in which its transactions are held by the General Public must be enhanced by the adhesion of every Christian Philosopher who holds a position in the Scientific world.

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* For nearly two years about one half of those joining have been foreign supporters.

The *Journal of the Transactions* reaches members in India, in most of the colonies, and in the United States; and the arrangements which have been made whereby foreign supporters may not only contribute papers, but take a part in the discussions by communicating opinions in MS., have so added to the interest and value of the journal as to lead to an increase of its circulation among the general public—one reason now assigned by many for seeking to obtain the *Transactions* being that "the papers and discussions often contain a careful and impartial examination of questions or theories of Philosophy and Science which are said to militate against the truth of Revelation." *

2. The following is the new list of the Vice-Presidents and Council:—

President.—The Right Hon. the Earl of Shaftesbury, K.G.

Vice-Presidents.

The Right Hon. the Earl of Harrowby, K.G., F.R.S.
Sir Joseph Fayrer, M.D., K.C.S.I., F.R.S.
W. Forsyth, Esq., Q.C., LL.D.
Philip Henry Gosse, Esq., F.R.S.
Rev. Principal T. P. Boultbee, LL.D.
J. E. Howard, Esq., F.R.S.
Rev. Robinson Thornton, D.D.

Hon. Auditors—G. Craufurd Harrison, Esq. J. Allen, Esq.

Hon. Treasurer.—W. N. West, Esq.

Hon. Sec. and Editor of the Journal.—Capt. F. W. H. Petrie, F.R.S.L., F.G.S., &c.

Council.

Robert Baxter, Esq. (*Trustee*).
Admiral E. G. Fishbourne, R.N., C.B.
R. N. Fowler, Esq., M.P. (*Trustee*).
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E. J. Morshead, Esq., H.M.C.S. (*F.S.*)
Alfred V. Newton, Esq.
William Vanner, Esq., F.R.M.S.
S. D. Waddy, Esq., Q.C.
A. J. Woodhouse, Esq., M.R.I., F.R.M.S.
Rev. Principal Rigg, D.D.
Rev. Prebendary C. A. Row, M.A.
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H. Cadman Jones, Esq., M.A.
Rev. W. Arthur, D.D.
C. R. Bree, Esq., M.D., F.Z.S.
Rev. G. W. Weldon, M.A., M.B.
Rev. Principal J. Angus, M.A., D.D.
J. Bateman, Esq., F.R.S., F.L.S.
The Master of the Charterhouse.
D. Howard, Esq., F.C.S.
Professor H. A. Nicholson, M.D., F.R.S.E.
F. B. Hawkins, Esq., M.D., F.R.S.
Sir H. Barkly, G.C.M.G., F.R.S.
J. F. Bateman, Esq., F.R.S.
The Bishop of Bedford.

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* It will be seen that in the arrangement of the papers the Council has sought to carry out the impartial investigation of important questions of Philosophy and Science as originally contemplated; and while some of the papers are purely scientific, the majority deal with those questions which bear on the great truths revealed in Holy Scripture. The exact scope of the Institute is reviewed in a paper by the late J. Reddie, Esq., circulated at the foundation of the Society, and published in vol. i., see p. 3.

3. Some new works of reference have been added to the Library, which continues to increase.

4. The Council regrets to announce the decease of the following valued supporters of the Institute:—

Rev. Prebendary E. Auriol, M.A. (Foundation Member); E. Beales, Esq. (Associate); Rev. M. Bird (Member); Rev. Canon C. Girdlestone, M.A. (Member); Rev. A. R. Hogan, M.A., T.C.D. (Associate); A. Hyams, Esq. (Associate); Rev. J. Knapp, A.C.K. (Member); Sir F. Lycett, Kt. (Foundation Life Associate); R. B. Painter, Esq., M.D., F.R.C.S. (Associate); Rev. J. M. Punshon, D.D. (Member); Professor J. S. Porter, LL.D. (Member); T. Stanton, Esq. (Associate); Mr. Serjeant A. Sargood, Q.C. (Life Member); The Rev. Sir W. R. T. M. L. Tilson, Bt., M.A. (Foundation Associate); Rev. Prebendary H. Wright, M.A. (Foundation Member).

5. The following is a statement of the changes which have occurred during the past twelve months:—

	Life		Annual	
	Members.	Associates.	Members.	Associates.
Numbers on 4th June, 1880	39	26	317	404
Deduct deaths	1	1	7	6
	38	25	310	398
Withdrawn			11	26
			299	372
Changes.........................			— 4	+ 4
			295	376
Joined between June 4th, 1880, and June 25th, 1881	4	4	34	75
	42	29	329	451
	71		780	
Total..........................		851		

Hon. Foreign Correspondents and Local Secretaries, 52. Total......903

Finance.

6. THE EARLY PAYMENT OF THE YEAR'S SUBSCRIPTIONS IS CONTRIBUTING GREATLY TOWARDS THE SUCCESS OF THE YEAR'S WORK; the Treasurer's Balance Sheet for the year ending 31st December, 1880, audited as usual by two specially qualified unofficial members, shows a balance in hand after the

payment of every liability. The amount invested in the New Three per Cent. Annuities being £1,124. 3s. 4d.*

7. The arrears of subscription are now as follow :—

	1872.	1874.	1876.	1877.	1878.	1879.	1880.
Members	1	1	4	2	0	3	10
Associates	0	0	0	4	1	9	15
	1	1	4	6	1	12	25

Meetings.

MONDAY, December 6, 1880.—"On the Modern Science of Religion, with Special Reference to those Parts of Professor Max Müller's 'Chips from a German Workshop,' which treat thereon." By Rev. G. BLENCOWE, F.R.A.S.

MONDAY, January 3, 1881.—"On the Early Destinies of Man." By J. E. HOWARD, Esq., F.R.S.

MONDAY, January 17.—"Pliocene Man in America." By Dr. SOUTHALL (United States) ; a second paper on the same, by Principal J. W. DAWSON, LL.D., F.R.S., of M'Gill College, Montreal ; and communications from the Duke of Argyll, K.G. ; Professor W. Boyd-Dawkins, F.R.S. ; Professor T. McK. Hughes (Woodwardian Professor of Geology at Cambridge), and others.

MONDAY, February 7.—Lecture by Dr. S. KINNS, F.R.A.S., "On Moses and Geology."

MONDAY, February 21.—"Implements of the Stone Age as a primitive Demarcation between Man and other Animals." J. P. THOMPSON, D.D., LL.D.

"Scientific Facts and the Caves of South Devon." By J. E. HOWARD, Esq., F.R.S.

MONDAY, March 7.—"Language and the Theories of its Origin." By R. BROWN, F.S.A.

MONDAY, March 21.—"Meteorology, Rainfall." By J. F. BATEMAN, Esq. F.R.S.

MONDAY, April 4.—"The Visible Universe." By Professor BALFOUR STEWART, F.R.S.

MONDAY, April 11.—"Supposed Palæolithic Implements of the Valley of the Axe, Devonshire." By N. WHITLEY, Esq. C.E.

MONDAY, May 2.—"An Examination of the Philosophy of Mr. Herbert Spencer." By the Rev. W. D. GROUND.

MONDAY, May 16.—"On the Rainfall of India." By Sir JOSEPH FAYRER, K.C.S.I., M.D., F.R.S.

THURSDAY, June 30 (Anniversary).—ADDRESS by the Right Hon. the Lord O'NEILL.

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* £21 has been funded since the 1st Jan., 1881, to complete the investment of life subscriptions received up to the 31st Dec. last, now making £1,135. 3s. 4d.

8. The meetings during this session have been held as usual, and the improvements in the Lecture Room have added to the general comfort.

The Journal.

9. The Fourteenth Volume of the *Journal of Transactions* has been issued. It contains many papers and communications from those whose names and the value of whose scientific researches are a sure guarantee for the "full and impartial" character of their investigations (object 1), and for the manner in which they have "considered the mutual bearing of the various scientific conclusions arrived at in the several distinct branches into which Science is now divided, in order to get rid of contradictions and conflicting hypotheses, and thus promote the real advancement of true Science" (object 3). Such work so carried on must tend to the advantage of Science, and to a right interpretation of the book of Nature; and we may well be sure that when the truth in regard to that Book is told, it will not be found to clash with that other book—the Book of Revelation.

The People's Edition.

10. The "People's Edition Fund" has enabled the Council to add three of the recent Papers in the *Journal of the Transactions* to this Edition. Copies of two of these,—by Bishop Cotterill and Professor Stokes, F.R.S.,* Lucasian Professor of Mathematics at Cambridge,—have been sent to selected persons (3,600) in EVERY PART of the world,—especially India and the Colonies,—with a suggestion that these Papers should be translated, or their insertion secured (wholly or in part) in local newspapers, or that they should be otherwise used to the best advantage in the several neighbourhoods. This step has proved of great advantage not only to the Institute itself, but also generally to the cause it was founded to maintain.

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* In his paper, "Professor G. G. Stokes, M.A., F.R.S. (Lucasian Professor of Mathematics at Cambridge, and Secretary to the Royal Society), one of the foremost scientific men of the present day, reviews the recent advances of science, and shows that the Book of Nature in no way runs counter to the Book of Revelation. The value of such a paper from one so eminent as a scientific layman cannot be too highly esteemed in these days, when scientific knowledge is often boldly claimed as the exclusive possession of those who deny the truths of Revealed Religion, and it is taken for granted that high scientific attainments are incompatible with Christian faith."—*Preface*, vol. xiv.

The People's Edition is sought for at home and abroad, the Papers selected for it being those written in a popular style, or useful as lectures, or the basis of such.

General Remarks.

11. The republication in America of some of the Institute's Papers continues.

12. The thanks of the Institute are due to the Newspaper Press, both at home and abroad, for the cordial manner in which it has seconded its objects.

Conclusion.

13. At the foundation of this Institute, in 1865, its then Vice-President said, "No one who watches the expression of thought among the cultivated intellectual classes in this country, through its literature, can deny that the opinion that science and revelation are directly opposed to each other has been spreading with fearful rapidity; * * we are suffering from the consequences of a culpable stagnation of thought, or from having failed to investigate fully and fairly, but rigidly, all the facts and arguments from time to time put forth as truths newly discovered by science, and as being contradictory to the Scriptures." That the Institute has already done some good service in endeavouring to meet and combat this evil all will acknowledge; but the tendency of modern thought throughout the world is such as to need an energy and a zeal on behalf of its objects, even beyond that already shown; and its steady growth and the encouragement already received will surely be deemed an additional incentive to the work.

Finally, the efficiency and success of the Institute may be contributed to by every member, and it should never be forgotten that its work is done, in the words of our motto, *ad majorem Dei gloriam.*

Signed on behalf of the Council,

SHAFTESBURY,

President.

DONATIONS IN 1880.

		£.	s.	d.
LIBRARY FUND..............	L. T. Wigram, Esq..........	5	0	0
	Rev. T. Wodehouse.........	1	1	0
		6	1	0
PEOPLE'S EDITION FUND.	G. Harries, Esq.	30	0	0
	S. Morley, Esq., M.P.	25	0	0
	J. E. Howard, Esq., F.R.S. (special purpose)	15	15	0
	I. Braithwaite, Esq.	10	0	0
	A. J. Woodhouse, Esq.......	5	5	0
	F. B. Hawkins, Esq., M.D., F.R.S.	5	0	0
	W. Hooley, Esq.	5	0	0
	J. Shaw, Esq.	4	0	6
	J. Moore, Esq.	2	2	0
	Rev. Sir G. Glyn, Bart. ...	2	0	0
	L. Biden, Esq.	1	1	0
	H. C. Dent, Esq.	1	1	0
	W. H. Ince, Esq.	1	1	0
	E. S. Nunn, Esq.	0	10	0
	Miss Curteis	0	10	0
		£108	5	6

The following Balance-Sheet was then read :—

FIFTEENTH ANNUAL BALANCE-SHEET, *from 1st January to 31st December*, 1880.

RECEIPTS.	£.	s.	d.	£.	s.	d.
Balance brought forward...				60	10	2
Subscriptions :—						
1 Life Member	21	0	0			
4 Life Associates	42	0	0			
				63	0	0
1 Member, 1876	2	2	0			
1 ,, 1877	2	2	0			
1 ,, 1878	2	2	0			
12 ,, 1879	25	4	0			
261 ,, 1880	548	2	0			
12 ,, 1881	25	4	0			
16 Entrance-fees	16	16	0			
1 Associate, 1877	1	1	0			
2 ,, 1878	2	2	0			
20 ,, 1879	21	0	0			
349 ,, 1880	366	9	0			
21 ,, 1881	22	1	0			
2 ,, 1882	2	2	0			
1 ,, 1883-6	4	4	0			
Arrears	1	4	6			
				1,041	15	6
Six Months' Dividend on £930. 13s. 5d. New 3 per Cent. Annuities	13	13	5			
Ditto on £1,081 12s. 8d.	15	16	4			
				29	9	9
Bequests—R. Napier, Esq., £100; J. Peek, Esq., £52. 10s.				152	10	0
Donations to Library Fund				6	1	0
,, People's Edition Fund				108	5	6
Sale of Journals, &c.				62	12	3
				£1,524	4	2

EXPENDITURE.	£.	s.	d.
Printing	453	16	6
Binding	18	4	10
Reporting	36	15	0
Stationery	53	0	4
Postage and Parcels (Home and Foreign)	168	6	7
Advertising	38	12	11
Expenses of Meetings ...	32	13	3
Rent to Christmas, 1880	160	0	0
Salaries for Year	62	0	6
Housekeeper	20	14	6
Travelling Expenses	14	12	4
Coals	4	18	0
Gas and Oil	5	13	0
Water Rate	3	0	0
Insurance	0	12	0
Sundry Office Expenses	7	9	11
Library, Books, Repairs, &c.	15	11	5
Hon. Sec. and Editor of Journal—Expenses 1879-80	210	0	0
Dr. Rae ...	2	2	0
Bankers' Charges	0	18	9
*Invested ...... £150. 19s. 3d. and £42. 10s. 8d. } New 3 per Cent. Annuities	189	5	0
Balance in hand	25	17	4
	£1,524	4	2

We have examined the Balance-Sheet with the Books and Vouchers, and find a Balance in hand of £25. 17s. 4d.

G. CRAWFURD HARRISON, } *Auditors.*
JOHN ALLEN, }

W. N. WEST, *Hon. Treas.*

* £21 Life Subscriptions since funded to complete up to 31st Dec., 1880.

[The Honorary Secretary (Captain F. Petrie) said that although the Report was in the hands of all present he would venture to point to the great importance of the statements contained in the first three paragraphs, and in the ninth and tenth sections. They showed that the Society was increasing in numbers, uniting leading men of science in its work, and becoming popular throughout the world; and he would add, in regard to section twelve, that the press in all parts of the world merited their best thanks, for it had cheerfully and generously seconded the efforts of the Council, not only in bringing the objects of the Institute, but also summaries of the results of its work, before the public. He finally alluded to the great aid afforded to the Council by all that interested themselves in the Society's objects and in the increase of its strength.]

Sir Henry Barkly, G.C.M.G., K.C.B., F.R.S.—My Lords, Ladies, and Gentlemen, I rise with much pleasure to propose the adoption of the Report which has just been briefly sketched by the Hon. Secretary. It is, as you will have learned from his remarks, of a highly satisfactory character, and it is clear from it that the Victoria Institute has quietly and unostentatiously, but with a considerable measure of success, been fulfilling the object for which it was called into existence some few years since. This object may be briefly described as being to show the world at large that the believers in revealed religion are neither ashamed nor afraid of facing the results of modern scientific research. Papers have been read by scientific men, before the Institute, and although it is possible that some of the speculations and expressions occasionally used in conducting philosophical and scientific inquiry may give pain to the religious feelings of some, yet on the whole I believe that our discussions have been conducted in a most gratifying way, and in the most excellent spirit. I think that any whose susceptibilities have been hurt may very well console themselves with the fact that although the results of scientific investigations may appear, for the moment, to conflict with this or that interpretation of a portion of the Scriptures, yet, that on the whole, and in the long run, they may be quite certain that such investigations will not be found to conflict with the truth of God's Divine Word. It would be out of place for me to attempt to make a long speech when you all wish to listen to the Annual Address from Lord O'Neill, and therefore, I will conclude these remarks by moving "That the Report of the Council now read be received and adopted and circulated amongst the Members and Associates." (Hear, hear.)

Mr. J. E. Howard.—I beg leave to second the resolution.

The resolution was passed, *nem. con.*

Sir Joseph Fayrer, K.C.S.I., M.D., F.R.S.—My Lords, Ladies, and Gentlemen, I have as much pleasure in moving the resolution which has been put into my hands as I feel quite sure you will have in receiving and supporting it. When I say that I am about to call upon you to give your thanks to those who have done so much for the Victoria Institute during the past year, I am sure that I shall secure all your suffrages. I find that in this resolution the usual honorary officers and the auditors are all included in one motion; but I think I shall be pardoned—indeed, I think I shall be only expressing what his colleagues would wish me to do—when I ask you to specially consider in this vote of thanks, the honorary Secretary. (Cheers.) I am well aware that Captain Petrie would not ask for this special notice, for he seeks the reward of his many labours in the success of the Institute; but still we owe it to ourselves to make some recognition of the invaluable services Captain Petrie has rendered to the Institute, and, therefore, I would ask that his name should be specially mentioned and included in the vote of thanks to which I will, in its formal terms, ask you to assent. Before doing so, however, I will with your permission say one or two words, — there is not time for many. First of all I should like to say how heartily and sincerely I congratulate the Victoria Institute upon the progress and success detailed to us in the Report which is in our hands. It tells us of progress, of financial success; it shows that the influence of the Institute is spreading widely, abroad and at home, that that influence is being exercised for good, and that the ideas of those who founded it are to a great extent being carried out. Therefore I may safely say that the Society is to be congratulated upon the present aspect of its affairs. If I might say one or two words further about the Society itself, I hope you will not think me presumptuous in doing so. This Society, if I understand it rightly, has for its object the investigation and elucidation of scientific and philosophical truth. There is nothing whatever really, and there never has been anything, that should have caused the breach that for so long has appeared to exist between what is called scientific truth and revealed truth. But if this Society proposes for itself the noble aim of making its scientific researches available for the purpose of reconciling these apparent difficulties and differences, it is performing an excellent work, and I am sure that there is no one, whether in the scientific or the philosophical world, or amongst the theologians, who would not wish it success; but if I may give a word of caution, it is that all this should be pursued with great care and caution. There must be no theological intolerance and bitterness on the one side, there must be no pride on the other; all must be prepared to meet each other hand to hand, and then the chasm will be bridged over, and not widened, as it has been in former years. I think it must be apparent to all that the tendency now is rather to lessen the difficulty than to increase it. I believe that any one is wrong who attributes (as is so frequently done) evil intentions to men of science. Those great masters of science, whose names we cannot mention without respect, are doing as much good as any one can possibly do. If they are teaching truth, they cannot be teaching that which is contrary to revelation. The Victoria Institute is, as I understand it, a scientific society which pursues its investigations in search of truth. There are many other societies which do the same thing, and they do it most loyally and faithfully, in a truly scientific spirit; but they do not always profess to make religion the foremost in the purposes to which I have alluded; and, perhaps, to a certain extent they may be to blame; but because their revelations may not always be acceptable to or appreciated by every one, there is nothing to justify us in looking upon them as something objectionable. I should think that this Society can do no better service than by seeking to draw together, and by inviting such men into its ranks, and by listening to and treating their papers with all patience, and giving them an impartial hearing. (Hear, hear.) I will simply conclude by moving the resolution, which is: "That the thanks of the members and associates of the Institute be presented to the Council, honorary officers, and auditors for their efficient conduct of the business of the Institute during the year."

Rev. R. P. Davies, M.A., F.R.A.S.—It is with very great pleasure that I second the vote of thanks which has just been proposed by Sir Joseph Fayrer, and I must add that I assent most heartily to the rider he has added to the resolution with regard to Captain F. Petrie. (Hear, hear.)

The resolution was then put and carried *nem. con.*

Rev. Prebendary Currey, D.D. (Master of the Charterhouse).—I have been asked to express, in the name of the Council, our thanks to this meeting for its vote of confidence and approval of the work that has been done. I most heartily and cordially agree that the name of the Honorary Secretary should stand foremost in this resolution—(Hear, hear,)—because we of the Council know better than any one else how very much is due to the indefatigable exertions he has put forth from the time when he first fostered this Society. (Hear, hear.) With regard to the Council, they have at heart that great object of the Institute, which has been so well described. They desire that the interests of science and of religion should go hand in hand, and are fully convinced of the importance of awaiting patiently the result of scientific inquiry; and, while on the one hand, they do not desire that we should hurry to conclusions which, unfortunately, it sometimes appears, men are hurried into, at the same time they are perfectly ready to listen, and to give due weight to every conclusion which seems to be drawn with carefulness, with conscientiousness, and with earnestness. Of course we know very well that in doing this errors will from time to time spring up. All that we feel is, that if those errors have sprung from an earnest search and desire after truth, they will correct themselves, or will bring forth other truths to correct them, and those who have been led into the errors will be the very first to acknowledge them. An important duty that the Council has to perform is,—I will not say an arduous one, but a responsible one,—to consider papers before they are read, and to consider how far those papers agree with the general purposes of the Institute, and at the same time not to impede the fair expression of opinion so far as is ot inconsistent with Holy Writ and with truth. This is a part which the Council have to perform. If they have performed it to the satisfaction of the Institute they feel that they have reason to be grateful, and they ask the members of the Institute, whom they represent in this respect, to excuse any inadvertency, and not to be quick to find out in that which is put forth, something with which they may not agree, but rather to be ready indulgently to accept for the better part all those truths which are being brought forward for discussion at the meetings of this Society. We cannot discuss the truth without, in some degree, giving pain to those to whom what we discuss is new. All light when it first comes to us dazzles the eye; but when the eye is accustomed to that light we very often find that that which only seemed to dazzle us when it first came upon us is, in truth, a medium by which we see more clearly, and can by it understand more truly and more scientifically and more religiously those great truths which it is the purpose of this Society to bring forward and to show that they are—I will not say consistent with—but that they are in truth part of that great body of truth of which we should desire a close understanding, feeling sure that all truth, whether it arises from scientific inquiry or from religious study, comes from one great source—that source of light with whom is no shadow of turning. (Cheers.)

The Earl of SHAFTESBURY, K.G.—I will now request the Lord O'Neill to be good enough to deliver the Address he has kindly prepared.

The Right Hon. the Lord O'NEILL then read the following Annual Address :—

ON THE CREDIBILITY OF THE SUPERNATURAL.

1. ALL unbelieving writers appear to me, in so far as I am acquainted with their works, to assume, without any attempt at proof, that the supernatural is incredible. Thus, with some of them, the fact that a miracle is recorded in a passage of Scripture is alleged to be sufficient to warrant its being pronounced unauthentic. Or the fact that an historical event coincides with an alleged prediction of it is pronounced a sufficient proof that the supposed prediction was written after the event, and therefore that the book containing that prediction falsely pretends to a prophetic character. Or, again, if a fact recorded by a confessedly uninspired historian is found

to be inconsistent with a fact stated in the Old or New Testament, the latter is coolly pronounced to be erroneous. I propose to offer a few observations on this subject, limiting myself to objections of a physical or metaphysical character, and to but a few even of these, as our time is short.

2. I took occasion, in a paper which I had the honour to read to this Society in last June, to refer to Professor Tyndall's oft-repeated assertion (made at the Midland Institute, at Birmingham, in 1877, and also on other occasions) that the principle of conservation of energy in the world of matter leaves no room for spontaneity to mingle with what he assumes to be the *necessary* play of the forces of nature. The only thing like a reason which he gives for this is, that *man's* power over nature is not creative, but only distributive. It is, however, easily seen that this is no reason at all. No one believes that man has any creative power over nature. What the theist maintains is, that (not man, but) God, has a creative power over nature; and this position is not in the least affected by Dr. Tyndall's observations. It is true that he calls the play of the natural forces *necessary*, which may convey the idea that the Deity has no more creative will than man; but he gives no proof that such is the case. He quietly assumes it, as indeed he is compelled to do, there being in fact no proof of it possible. In the Appendix, Note A, will be found some remarks lately communicated to me in a letter by one to whom, I doubt not, the members of this Society will be ready to pay attention—the Rev. T. Romney Robinson, D.D., Professor of Astronomy at Armagh, and which he has kindly permitted me to make use of on the present occasion.*

3. The real question is, How did the forces of nature originate? To say that they are self-created is a contradiction. It means that they acted before they existed, which is absurd. They must therefore either be self-existent, or created by external agency, these being the only other suppositions possible. And the supposition of creation by external agency implies also self-existence, since the Creator must either be self-existent, or must owe His existence, more or less remotely, to a self-existent Being. The question, then, lies between a self-existent Creator, and a self-existent phenomenal universe. Those who believe in the latter have to encounter a similar difficulty to that of those who believe in an intelligent Creator. If they ask us, How came God to exist? we ask them in turn, How, *without God,* came matter and force to exist? Philo-

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* See Appendix A.

sophy, unaided by any other source of knowledge, is as little able to answer one of these questions as the other.

4. But an objection is sometimes made, on metaphysical grounds, to the very idea of creation. It implies, it is said, a First Cause, which is inconsistent with the idea of an absolute Being, such as God must be supposed to be, because an absolute being has no relation to anything, and, therefore, a being between whom and the universe there is the relation of cause and effect, cannot be an absolute being. To my own mind, if I may venture to say it, metaphysical arguments which deal with the First Cause, the Absolute, and the Infinite, are not very convincing. Even in the most certain of the sciences—mathematics—we find that we are out of our depth when we arrive at infinities. We cannot, therefore, expect to grapple with infinities in regions less sure and definite. Dean Mansel, in his "Limits of Religious Thought," takes this view. He observes, that the contradictions to which we seem to be conducted by such speculations manifest themselves in *opposite directions.* They are analogous to those in which we find ourselves involved when we endeavour to contemplate space and time in all their generality. We cannot conceive either space or time as finite, because, however far we extend them in idea, we can find no bounds to them. Neither, on the other hand, can we conceive them as infinite, because our minds cannot grasp infinity. That we are in a similar strait when we try to reason about the First Cause, the Absolute, and the Infinite, Dean Mansel shows in the work just referred to. The contradictions, he observes, are apparent, not real; and he thus distinguishes between apparent and real contradictions. "The latter (the real) are one-sided, and necessitate a belief in the opposite direction; the former are two-sided, and appear to press equally in opposite directions, from both of which together we find it impossible to exclude belief. Thus, to take an example of the unilateral (one-sided) kind, I find a contradiction in the conception of a circular square, and I cannot believe in its possible existence; but then, on the other hand, I am compelled to believe that every existing square is not circular. Whereas, to take an example of the bi-lateral (two-sided) kind, I find a seeming contradiction in the conception of an absolutely first or last moment of time; yet I find it impossible to believe that neither of these can be true, and I find it equally impossible to believe that both can be true. The reason of this distinction is obvious. The former class of contradictions exists between attributes, both of which are within the limits of positive thought. To constitute a real contradiction, it is necessary that we should have

a distinct conception of both the repugnant members. Where no such conception exists, the object is *above* reason, but is not *opposed* to it: we may be warranted in believing the fact of its existence, though we are unable to conceive the mode" (*Limits*, &c., p. 67, note).

5. Thus the apparent contradiction involved in the belief that an absolute Being should be placed in the relation of Cause to the universe, arising, as it does, from our inability to comprehend the Absolute and the Infinite, supplies no argument whatever against the Scriptural doctrine that "God created the heaven and the earth." It only shows the imperfection of our understandings, and justifies Dean Mansel's words when, in another passage of his book, he speaks of "those barren, vague, meaningless abstractions in which men babble about nothing under the name of Infinite" (*Limits*, &c., p. 61). Mr. Herbert Spencer gives a lengthened quotation from this work of Dean Mansel's, on the subject of the apparent contradictions of which I have been speaking, but draws from them a different conclusion, namely, "that the power which the universe manifests to us is utterly inscrutable" (*First Principles*, p. 46); whereas the Dean, acknowledging that it is inscrutable to unaided reason, would have us to go to another source of information, viz., Revelation.

6. It is to be observed that Mr. Spencer, in a subsequent portion of his book, reduces everything to Force as the *ultimate of ultimates*—as that Power, in fact, which guides the universe, and which he has pronounced to be "utterly inscrutable." It may be presumed that he has satisfied his own mind that there is no contradiction between the alleged inscrutability of that Power, and his pronouncing the Persistence of Force to be an *axiom* (*First Principles*, pp. 192b and 192c, 3rd ed.). But I confess myself unable to see how the two assertions can be compatible. If Force be utterly inscrutable, how can we know that persistence is a quality of it? We are, indeed, aware that the unit of force has not been known to vary throughout human experience. But it would require something beyond and above experience to justify the assertion that it can never vary under any circumstances, not even at the volition of a Divine Being. I ventured to make some remarks on the alleged axiomatic character of the Persistence of Force in the paper already alluded to, and need not now repeat them.

7. To deny the supernatural is to strike at the root of all religion. We must endeavour, however, to give a clear account of what we mean by the supernatural. It is, as the word denotes, something which is above, or beyond, nature. But what, again, is nature? The word, as I conceive, applies

to whatever is made known to us either by our individual consciousness, or by our senses; in short, the *ego*, and that portion of the *non-ego* which we call the phenomenal world. The supernatural extends to the remaining portion of the *non-ego*—that is, incorporeal spirits, including, of course, the Deity; these not being perceptible by the senses, unless miraculously made to be so, but believed in upon other grounds. But although pure spirit is not an object of sense-perception, its acts and influences may be so; of which we have a notable example in the fact, acknowledged by all Christians, that the phenomenal universe is perceptible to the senses, while its Creator is veiled from our sight, hearing, or touch. In the phenomenal world are to be included the various forces with which matter, both animate and inanimate, is endowed, as volition, muscular power, electricity, gravity, &c., all of which forces are made known to us by their power to produce in us some bodily sensation or perception. These powers and forces are a part of nature, and are not to be included in the idea of the supernatural.

8. The Supernatural may be conveniently divided into—1. Supernatural beings, as spirits (including the Great Spirit of all); and 2. Supernatural occurrences, as miracles. Of the former, as has been observed, our senses afford no direct evidence, but they bear indirect witness to their existence by enabling us to perceive the effects of their action. The latter are occurrences which, as they require for their production some power beyond that of man, or of nature as influenced and directed by man, are to be attributed, in whole or in part, to the action of a supernatural being or supernatural beings.

9. As to the existence of God, it seems to me almost incredible that any thinking person should consider it more probable, apart from Revelation, either that matter should be self-created, or that it should have existed, with all its "promise and potency," from eternity, than that it should have been created by an intelligent, conscious, and powerful Being. It has become the fashion with some to disparage the argument from design, or (to use a word recently suggested) from *adaptation*. The difference between the two expressions seems but slight, inasmuch as adaptation—i.e., such adaptation as is displayed in the universe—argues design. One or two isolated instances of adaptation might, we may grant, be accidental. But the universe is a system of adaptation from one end to the other, and this could not possibly be accidental. A key might accidentally fit into a key-hole for which it was not made. It might even turn the bolt, if the lock were of a very simple construction, without our being warranted in saying positively

that it was designed for that purpose. But in proportion as we suppose the wards to be more complicated, the smaller is the probability that the adaptation could be accidental. In fact, in the case of what we should call a good lock, i.e., one of a very complicated construction, we have the utmost practical certainty that the key which opens it was designed to do so. But this is not all. In order adequately to illustrate the case of nature, we must suppose thousands of locks, each opened by its own key and by no other, which multiplies what we have already seen to be a practical certainty by a number equal to the number of the locks. Now this, I venture to say, is the kind of certainty we have of design in the adaptations that are to be found in the universe. They exist in myriads. Some remarkable examples of them are brought together in Whewell's "Bridgwater Treatise on Astronomy and General Physics." One of these is the adaptation of the muscular powers of all animals to terrestrial gravity. If the unit of this force were considerably greater than it is, no human being, or other animal, endowed with its present muscular powers, could leap or walk, or even crawl. If, on the other hand, the unit of gravity were considerably diminished, say to what it amounts to in the moon, the exertion now required in order to jump a foot high would carry us 80 feet upwards into the air. Another example may be found in the quantities, respectively, of oxygen and nitrogen in the atmosphere, as compared with our breathing faculties. Were these elements mixed in other than their actual proportions, life could not long continue. Again, if the temperature of the sun were to any great extent increased or diminished, life could not exist on the earth unless the frames of men and animals were altered accordingly. These and thousands of other examples might be mentioned, in which the *arbitrary quantities*, as they are called,—i.e., the quantities which might have been different from what they are,—are so adapted to each other as to make life and its conveniencies and comforts possible; and so great is their number that it seems wonderful that any thoughtful persons should deny that they are the result of design. And since design necessarily implies a designer, it follows that there must be an intelligent Creator of the universe. How it came to pass that such a Creator should exist, is of course a mystery far beyond our ken. We are quite unable to go back farther. But this is no reason why we should refuse to go back as far as our reason will take us by the hand. To refuse to acknowledge the Deity because we cannot account for His existence would be most irrational. Were we to disbelieve everything that we cannot account for, we should believe in nothing.

10. Thus far I think we may assert that Reason and Philosophy conduct us, unaided by Inspiration. And since belief in God is belief in the supernatural (the Deity being veiled from our direct observation, and therefore being outside the phenomenal world), there ought not to be much difficulty to those who have proceeded so far, in admitting the existence of other incorporeal spirits, such as angels. It is unnecessary to say that our belief in God, founded on philosophical reasoning, is amply confirmed by Scripture. But for the existence of subordinate spirits we are thrown more completely upon the testimony of Scripture. Those, however, who have arrived at belief in God, and have in so far admitted the existence of the supernatural, need not hesitate to receive that testimony. The Creator of all matter must Himself be immaterial, and to those who believe that one immaterial Spirit exists, it seems as easy to admit that He should create other spirits, as that He should create matter.

11. Thus much as to supernatural beings. We have now to consider supernatural occurrences, or miracles. I have said (sec. 8), that these are to be attributed, wholly or in part, to the agency of a supernatural being, or beings. The first miracle of all is the creation of the universe, which we attribute to the agency of God. It was no *violation* of the laws of nature. Rather, it was the *commencement* of those laws. It was something *beyond* nature, but not *against* it. This is the view of miracles in general, which is now usually adopted. Any deviation from the ordinary course of nature is attributed, not to a violation or suspension of her laws, but to the introduction of some higher law which, acting together with the ordinary laws of nature, produces (to borrow a metaphor from mechanics) a *resultant* different from that which the ordinary laws, acting by themselves, would lead us to expect. "We should see in a miracle," says Archbishop Trench, in his valuable work on the subject, "not the infraction of a law, but the neutralizing of a lower law—the suspension of it for a time by a higher. We continually behold in the world around us lower laws held in restraint by higher, mechanic by dynamic, chemical by vital, physical by moral. Yet we do not say that there was any violation of law, or that anything contrary to nature came to pass: rather, we acknowledge the law of a greater freedom swallowing up the law of a lesser."* The Archbishop then goes on to mention some instances, as the

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* Trench on *Miracles*, Preliminary Essay, ch. ii. p. 17.

power we possess of raising an arm, by which the law of gravity is not annihilated or violated, but is only counteracted by the higher law of the human will; the preservation of animal substances from decay by means of salt, which does not destroy any chemical laws, but only restrains and holds them in suspense; and so forth. These and similar occurrences bear a strong analogy to miracles, from which they seem to be distinguished chiefly by the fact that we witness them every day. But my power to raise my arm by an exertion of will is as inexplicable in its way as is the power of God to cure a disease or to raise the dead. We do not call it a miracle, because it lies within human power, and so may be witnessed at any time; and human power only extends to the moving of our own bodies, or of other matter through the intervention of our bodies, whereas the will of the Deity, as Christians believe, can affect all matter without any intermediate means, as is observed by Professor Jellett, now Provost of Trinity College, Dublin, in a passage which, in my former paper, I took occasion to quote from his Donnellan Lectures on the Efficacy of Prayer. But the power of our wills over our bodies, though a matter of every-day experience, is as *unthinkable*—to use a word much in fashion with unbelieving philosophers—as is the power of the Deity to work a miracle.

12. The difference between a miracle and an occurrence which, though equally inexplicable, is yet not considered miraculous, is thus further stated by Archbishop Trench.—"All is wonder. To make a man is at least as great a miracle as to raise a man from the dead. The seed that multiplies in the furrow is as marvellous as the bread that multiplied in Christ's hands. The miracle is not a *greater* manifestation of God's power than those ordinary and ever-repeated processes: but it is a *different* manifestation. By those other God is speaking at all times to all the world: they are a vast unbroken revelation of Him. . . . But in the miracle, wrought in the sight of some certain men, and claiming their special attention, there is a speaking to them in particular. There is a voice in nature which addresses itself directly to them, a singling of them out from the multitude. It is plain that God has now a peculiar word which they are to give heed to, a message to which He is bidding them to listen" (*Preliminary Essay on Miracles*, ch. ii., pp. 11, 12).

13. There are also occurrences which, although they may be accounted for by natural causes, are yet of a miraculous character, from the fact of their having been predicted by one who has no natural means of knowing beforehand that they would

take place. Thus, although nothing is more natural than that a man should carry water into a house, yet the fact that our Lord was able to tell Peter and John that they should, at a particular time and place, meet a man bearing a pitcher of water into the particular house at which He was to celebrate the Passover with them, was a remarkable miracle. In the same manner, although there was nothing contrary to nature in a fish having a piece of money in its mouth, yet our Lord's being able to tell Peter that such should be the case of the first fish that should come to his hook, gave a miraculous complexion to the event. A similar observation may be made with regard to some of the plagues of Egypt, which might in themselves have arisen from natural causes, but were marked as the finger of God by the fact that Moses was inspired to predict them. To miracles of this nature, Archbishop Trench applies the epithet "providential."

In the foregoing observations, I have used the expression "Laws of Nature," for convenience, and because they are in general use. I would, however, refer again to the Appendix (Note B.) for some remarks on this expression selected from the same communication of Doctor Romney Robinson to which I before referred.

14. To return, however, to miracles in the proper sense of the word. Bishop Watson says, as quoted in Mant's Bible,—"I think it idle, if not impious, to undertake to explain how the miracle was performed; but one who is not able to explain the mode of doing a thing argues ill if he thence infers that the thing was not done. The machine of the universe is in the hand of God. He can stop the motion of any part, or of the whole, with less trouble, and less danger to injuring it, than any of us can stop a watch."

15. The miracle specially referred to in this quotation is that described in Joshua x., when the sun and moon are said to have stood still while Joshua was pursuing the defeated kings. And as that miracle has been made the subject of much adverse criticism, it may be well to say a few words about it. We need not discuss the various views of commentators as to the facts related. Some point to the fact that the passage is professedly a quotation from a book of whose inspiration we have no proof, namely, the Book of Jasher. Others look upon the circumstance as figuratively described, and take the words to mean nothing more than that Joshua prayed that the destruction of the enemy might be accomplished before sunset, and that God answered his prayer. And reference is made to Homer's Iliad (ii. 412) as recording a similar case; Agamemnon being there represented as praying that the sun might not go down until he had sacked Troy. These views, as I

have said, it is not necessary to our present purpose to discuss, as we are only concerned to show the *credibility* of the miracle, the question of its actual occurrence being beyond our immediate scope. Whatever interpretation we may put upon the passage, our object is gained if we can show that the miracle *may* have occurred.

16. Let us now hear some of the objections. It is said that the apparent standing still of the sun and moon must involve the supposition that the diurnal revolution of the earth came to a stop; this, again, involving, as a consequence, the jerking off of all its inhabitants, and of everything resting on its surface, on the well-known principle that whatever is in motion must continue to move in the same direction, and with the same velocity, until something interferes with that motion. In this case the attraction of the earth would cause a deviation from what would otherwise be rectilinear motion along the tangent to the parallel of latitude on which each thing or person had been situated, and would cause them to revolve round the earth in ellipses or other conic sections, instead of moving in a straight line. Since nothing of this kind took place, the story is not, they argue, to be believed. But surely if the phenomenon was effected by a cessation or diminution of the earth's motion round its axis, the same power that caused this to take place could prevent such a consequence from ensuing as that which has been sketched out. The prevention of that consequence would not be at all a more wonderful exertion of power than stopping the earth's revolution would be. But is it not rather presumptuous to pronounce that a miracle must have been wrought in a certain way, if at all? How can we take upon us to say that the one in question could only have been effected by an interference with the earth's rotation. An increase in the refracting power of the atmosphere would cause the heavenly bodies to remain in sight for a much longer time than usual; and that, without any jerking off of the inhabitants of the earth. Besides, it seems possible that the phenomenon may not have lasted so long as is generally supposed. It appears to have commenced after the defeat of the five kings by Joshua, and while Israel was in pursuit of them. It would therefore be sufficient that daylight should continue until the enemy was overtaken, which might not require a very long time. It is true that the narrative, as it appears in the authorized English version, states that the sun "stood still *in the midst of heaven,* and hasted not to go down about *a whole day.*" But this translation does not seem to convey accurately the meaning of the original. It is stated in Doctor Adam Clarke's note on the

passage, and also in Calmet's *Dictionary of the Bible*, that many learned Hebraists understand by "the midst of heaven," not the meridian, but that part of the sky which is midway between light and darkness, namely, the horizon, and which forms a natural division between the upper, or visible, heavens and the under heavens, which are invisible, as being beneath the apparent horizon. The word in Hebrew, which is translated "the midst," is *chetsi*, i.e., division, which quite bears out this idea. Again, it is observed that the words translated, "hasted not to go down about a whole day," mean "hasted not to go down, *though the day was completed*." This would give a very imtelligible meaning to the whole narrative, viz., that Joshua, believing that the enemy, unless completely destroyed, would afterwards rally, and seeing that the sun was near going down, commanded it (of course under inspiration) to remain above the horizon as long as daylight should be required to enable him to complete the destruction that had been commenced. This, as already observed, might not require a very long time—perhaps not more than one or two hours—and an increase in the refractive power of the atmosphere, either through its increased density, or through an increased accumulation of moisture, would be quite sufficient to prolong the light of day for that time.

17. An objection to this reasoning has, however, been raised which at first sight might seem fatal. It is known that Beth-horon, near to which place the miracle is said to have occurred, lies to the west of Gibeon, and therefore, if the sun appeared to Joshua to stand still over Gibeon, it would seem that it must have been standing in the eastern part of the heavens; from whence it would follow that it was then early in the day. But Calmet, who enters very minutely into this part of the question, shows that the fact of Joshua and his army being on the west side of Gibeon is not inconsistent with its being near the time of sunset. Gibeon was situated on a hill; and the rays of the setting sun would shine upon it. If, then, by any means, those rays could be caused to retain their horizontal direction for some time, they would still shine upon Gibeon. It would be by no means an unusual figure of speech to put the sun itself for the rays or light of the sun; and thus the setting sun might be said to stand still on Gibeon, not meaning that it was directly *over* Gibeon, but that its light continued to shine upon it.

18. As to the moon, it is said that the sense of the original language is satisfied if we understand that she *maintained her brightness* while the miracle lasted, not necessarily remaining stationary, but emitting the same effulgence. Calmet states some good reasons for believing that she was at the time in

her second quarter, and nearly full. The miracle, he observes, could not have occurred exactly at full moon, because in that case the moon would have been below the horizon when the sun was above it. This, I may observe, is not *strictly* accurate; for in consequence of the inclination of the moon's orbit to the ecliptic, the moon, even when full, might be above the horizon at the same time with the sun, provided that she were at a considerable distance from either node. But the inclination of her orbit being only about five degrees, this could only last for a very brief time—so brief as not practically to invalidate Calmet's reasoning. The miracle, then, could not have taken place at full moon. Nor, again, could it have taken place at new moon, because then the moon does not shine at all. Again, if we suppose it to have occurred shortly after new moon, the moon would set very soon after the sun; and, moreover, her light would be very feeble, as would be the case all through her first quarter. The only time, therefore, at which she would be of use towards the accomplishment of Joshua's object, would be when she was in her second quarter; probably when nearly, but not quite, full moon. Taking the moon's age to be in accordance with this conjecture, the miracle cannot be supposed to have occurred soon after sunrise, as the moon would not then be visible. She would, in fact, only become visible a short time previously to sunset, and would then continue to shine all through the night. This confirms the conclusion before arrived at, namely, that the miracle took place about, or near, the setting of the sun. If it had been in the morning, as some suppose, it is difficult to believe that Joshua should be under any apprehension lest daylight should not last sufficiently long to enable him to complete his pursuit of the enemy.

19. The probable *time of the year* leads also to the belief that a not very large increase in the refraction of the atmosphere would be sufficient for the miracle. There is reason to suppose that it was not far from midsummer, at which time the sun is at a shorter distance below the horizon at midnight than at any other time of the year. Joshua had crossed the Jordan on the tenth day of the first month, i.e., about the 5th of April. If we allow a little more than two months from this for the taking of Jericho and Ai, and the ceremonies at Ebal, we are brought to about midsummer, as we have just said. And at that time of the year in Judea (which is at about 35° 30′ north latitude) the longest day, including the morning and evening twilights, lasts about eighteen hours. If, then, the light proceeding from the sun could be maintained during the remaining six hours, the object of the miracle would be attained. And

this could be accomplished by increasing the refractory power of the atmosphere, or by producing a kind of mirage, such as is frequently occasioned by natural causes, and by means of which objects below the horizon are occasionally seen as if at a considerable altitude above it.

20. A few words must be said in reference to Hume's argument against miracles, and Paley's reply to it, although the members of this Society must be familiar with both. Hume's argument is this: It is contrary to experience that a miracle should be true, but not contrary to experience that testimony should be false; whence he infers that no human testimony can in any case render a miracle credible. Upon this Paley observes that there is an ambiguity in the expression, "contrary to experience," which is calculated to mislead. "Strictly speaking," he says, "the narrative of a fact is *then* only contrary to experience when the fact is related to have existed at a time and place, at which time and place we, being present, did not perceive it to exist. . . . Here the assertion is contrary to experience properly so-called; and this is a contrariety which no evidence can surmount. It matters nothing whether the fact be of a miraculous nature or not." He means, of course, that this makes no difference *in the case just supposed*, because any fact, whether miraculous or of an ordinary kind, would, in that case, be absolutely incredible. He then continues: "And short of this (i.e., of such a contrariety to experience as he has just described), I know no intelligible signification which can be affixed to the term 'contrary to experience,' but one, namely, that of not having ourselves experienced anything similar to the thing related, or such things not being generally experienced by others. I say 'not generally,' for to state concerning the fact in question that no such thing was *ever* experienced, or that *universal* experience is against it, is to assume the subject of the controversy." The remainder of Paley's remarks may be thus condensed: If the objection to the credibility of a miracle be founded on its non-conformity (for "contrariety" is not the proper term) to *general*, as distinguished from universal, experience, there can be no reason, granting the existence of a God, to reject it. For "the force of experience, as an objection to miracles, is founded on the presumption, either that the course of nature is invariable, or that if it be ever varied, variations will be frequent and general." Whoever believes that there is a God will admit that the course of nature is the agency of an intelligent Being. Let it, then, be so called, and it might be expected that such a Being, on occasions of peculiar importance, should interrupt the order which He had appointed, and

yet that such interruptions should occur but seldom. In fact, if they often occurred, they would not be miraculous.

21. Thus far, as to miracles being contrary to experience. A little consideration is also due to Hume's second assertion, namely, that it is not contrary to experience that testimony should be false. This assertion is much too vague to have the significance which Hume would attach to it. The actual question is, Does experience furnish us with examples of men inculcating the highest morality and exhorting to speak truth every one with his neighbour, and yet imposing on the world a gigantic fraud in recording Christ's miracles, especially that culminating one of all, His resurrection; and that, for no advantage to themselves, but, on the contrary, to bring on themselves imprisonments, scourgings, and death, with no hope (in the case supposed) of an improved condition in a life beyond the grave? If testimony borne by such men, and under such circumstances, could be shown to have ever been false, there might be some ground for the second part of Hume's argument. But it may be safely asserted that such a case has never been known. It would, in fact, be a contradiction to suppose that such men as Christ's Apostles should be guilty of a gross deception. The only other supposition by which their testimony could be invalidated is, that they were enthusiasts, deceived by the ardour of their own imaginations. This also has been well refuted by Paley. Their slowness of heart to believe that their Lord was risen until they had exhausted every proof of it, shows anything but a proneness to deceive themselves. Moreover, the non-production of His dead body affords the best proof that His resurrection was an actual fact, and not a mere phantom of imagination. In Paley's words, "The presence and absence of the dead body are alike inconsistent with the hypothesis of enthusiasm; for, if present, it must have cured their enthusiasm at once; if absent, fraud, not enthusiasm, must have carried it away" (*Evidences*, part ii., ch. 8).

22. It has been frequently observed that Paley's own argument in behalf of miracles contains a fallacy. And if we confine our attention to his formal statement of it, I think this must be admitted. He says, "Now, in what way can a revelation be made but by miracles? In none which we are able to conceive. Consequently, in whatever degree it is probable, or not very improbable, that a revelation should be communicated to mankind at all, in the same degree is it probable, or not very improbable, that miracles should be wrought" (*Evidences*, section 3 of Preparatory Considerations). This is true, provided that in estimating the probability that a reve-

lation should be given, we have taken into account the necessity that it should be accompanied by miracles. For, otherwise, this might destroy the probability of a revelation. If, for example, miracles were utterly incredible (as Hume supposes), the fact that a revelation cannot be given without them, so far from imparting to the miracles the probability which would otherwise attach to the revelation, would make the revelation itself incredible. It would be what logicians call a destructive conditional syllogism, in which the major premise states the sequence of one proposition (denominated the *consequent*) from another (called the *antecedent*). If the minor premise denies the consequent, the syllogism is destructive, and the rule is that the conclusion must deny the antecedent. Or if the minor premise is constructive, i.e., if it affirms the antecedent, the conclusion must affirm the consequent. Put in this form, the major premise in the present case is, — "If a revelation be credible, miracles are credible." Hume would take for the minor premise the proposition—"Miracles are not credible"; from which, if it were true, the conclusion would necessarily be, that "a revelation is not credible." Paley, on the other hand, would take for his minor premise — "a revelation is credible," the conclusion from which would be that "miracles are credible." Now, as this conclusion is in direct contradiction to Hume's minor premise, it is incumbent on Paley to show that the latter is false. This he does afterwards in the manner already described, and therefore I think he may fairly be looked upon as having made out his case. But until he had shown Hume's objection to be without foundation, his syllogism, formally stated, could not be considered conclusive. This is the only thing approaching to a flaw that has, so far as I am aware, been discovered in *Paley's Evidences*, but it is only one in form. Substantially his reasoning is unanswerable. It has lately become fashionable with some to decry Paley and Butler, and other books which deal with the evidences of Christianity as antiquated, and unsuited to the advanced theories of our own time. This seems to be for no other reason than because they argue the question so clearly and unanswerably as to dispel the vague mistiness in which those advanced theories are shrouded. And I venture strongly to recommend all whom my words may reach, to peruse these books, if they should not have already done so, and make themselves thoroughly acquainted with the reasonings they contain. This will be the most effectual means of guarding themselves against being lost in the quagmires of a pretentious and hollow scepticism.

SUPPLEMENTARY REMARKS.

Since this address was printed, my venerated friend, Doctor Robinson, of Armagh, to whose suggestions I was already so much indebted, has pointed out to me an omission in the argument from Adaptation given in pp. 16 and 17. I ought to have recognized the fact that that argument is sometimes met by the principle of "the Survival of the Fittest." Professor Tyndall, in his Belfast Address, gives some examples from Mr. Darwin's book on "The Origin of Species," to show that this writer was fully aware of, and duly appreciated, the multitudinous adaptations which are to be found in what we call Nature. And in reference to this he observes, that "it is the mind thus stored with the choicest materials of the teleologist that rejects teleology."* The principle of the Survival of the Fittest assumes that innumerable combinations of atoms once existed, of which a very few, comparatively, were adapted to the surrounding circumstances. These few are supposed to have been preserved, while by far the greater number, not being so adapted, perished. From this it is argued that all is *haphazard*, and that there is no need to suppose an intelligent Creator, the combinations which endured being endowed with a power of self-adaptation, whereby they settled themselves into permanency. Now this is a mere gratuitous assumption; for it can never be proved that combinations originally existed which perished out of existence, leaving no track. Moreover, if we should grant that such was the case, we are still confronted by the questions, "How came these atoms to exist? and how did they get the power to combine?" There can be but two hypotheses. Either they existed from all eternity, or they were created by an intelligent Being; for the only two other suppositions are so irrational that they may well be dismissed—namely, that they were created by an unconscious or unintelligent being, or that they created themselves. Now, the question which of the two former hypotheses is the true one, is not decided by granting the principle of the Survival of the Fittest. For there is nothing against reason in believing that an intelligent Creator should adopt that principle. To a certain extent we see that the fittest combinations do alone survive. Animals and plants that once were suited to certain climates have become extinct, or have been compelled to seek other abodes in consequence of the climates having altered. Again, weaker animals have been banished or greatly diminished in number by stronger ones gaining the mastery over them. But all this need not prevent us from believing them to have been brought into being, and endowed with their various qualities, by an intelligent Creator. Many persons, of whom I profess to be one, consider the latter to be by far the more philosophical hypothesis, even apart from the testimony of Scripture. That matter, with all its promises and potencies, should either have been eternal or have come into existence of itself, or, lastly, have been created by unconscious agency,—all these suppositions are considered quite unphilosophical by many who have fully as good pretensions to judge as have their opponents.

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* For the sake of some readers, it may be as well to state that "teleology" means the doctrine that there is a design or purpose in Creation.

Dr. Robinson observes that there are combinations to which the principle of the Survival of the Fittest cannot apply, as for example, *water*. In his letter, necessarily brief, he does not further explain this. But I think it may be presumed that his meaning is, that water, considered as perfectly pure, and free from any matter which it may hold in solution, is everywhere the same, and is never unfitted to its surroundings, nor can any one portion of it be more or less able to endure than another. Wherever it exists, it is precisely the same chemical combination of its two elements. And, moreover, no amount of heat or of cold can destroy it. Subjected to any amount of cold at or beyond the degree of freezing, it exists as ice; and subjected to any degree of heat at or beyond the boiling point, it exists as vapour, its chemical composition being always preserved, and its liquid state being always capable of being restored by an alteration of the thermometrical conditions. I am unwilling to trouble my friend, Dr. Robinson, for an explanation of this, as he has been already so kind, but better chemists than myself can judge whether the conjectural explanation above given is the correct one.

Dr. Robinson, in the letter above alluded to, gives some additional reasons, beyond those stated by me, for holding that Joshua's miracle was not caused by a cessation of the earth's rotation. Some of those who attribute it to this cause remark that a sudden suspension of all terrestrial inertia would account for it, and for the things on the earth's surface remaining steady, without involving the necessity that one miracle should be supplemented by another. On this Dr. Robinson remarks that if all terrestrial inertia had been suspended, the battle could not have been carried on, inasmuch as it is owing to inertia that an arrow or dart can reach its destination, or that even a blow can take effect.

P.S.—Doctor Robinson has since been so kind as to explain to me his meaning when he says that the principle of the Survival of the Fittest does not apply to water. The following quotations from his letter will help the reader to see the substance of his explanation. He says—"Water has qualities which cannot be explained by the 'survival' hypothesis, but which have a remarkable adaptation to the occupation of the Earth by living beings." Some of these qualities are, "the specific gravity of frozen water, and the point of its greatest density—these moderate the cold in high latitudes; the low temperature at which it is vaporized, on which depends the whole system of springs and rivers—but for it, all the earth above sea level would be an arid waste; yet more, the vapour is little transparent to non-luminous heat, and therefore protects the earth from the cold of excessive radiation—and in the hands of man this vapour has become an instrument of power, whose extent imagination can scarcely fathom!" Lastly, "The power of water to dissolve a great number of substances without altering their constitution, makes it an element without which neither animal nor vegetable life could exist." And he adds, "If any one thinks that these qualities were the result of accident, I can only say of him, in the words of Scripture, that he is 'under a strong delusion.'" I would just add, that Dr. Tyndall, in his lectures on heat, tries to disparage the argument for Design derived from the point of greatest density in water, by pointing out one other substance which behaves similarly. But surely the fact that water is *one* of two exceptions—or even one among a greater number, had such been the case—to the ordinary rule, when so much depends upon its being an exception, cannot be supposed to weaken the argument for Design.

APPENDIX A.

On the doctrine of Conservation of Energy, the Rev. T. Romney Robinson says (referring to the heat produced by the collision of two equal non-elastic bodies),—"If these bodies be such as soft clay or putty (in which case they should rather be called viscid than non-elastic) a very large portion of their *vis viva* is expended in changing their figure, for they flatten and cohere; and I am not aware of any experiments having been made to ascertain whether any, or how much, heat is evolved in the process. But it is also possible to conceive two ultimate atoms of matter colliding. They are unelastic because incompressible, and their figure cannot be altered; and we can conceive no other result than that their motion must be destroyed. And this is a matter of some importance, because in the kinetic theory of gases the molecules must be supposed to be elastic; or else in their collisions they would ultimately come to rest. Now this bears on the constitution of the ether, to which it is the present fashion to refer all physical forces. But the ether must be intensely elastic ; and that elasticity cannot be supposed to proceed from any kinetic arrrangement, for that would require the atoms of the ether, themselves, to be elastic ; and we have no choice left us, except we adopt the hypothesis to which Challis refers, of an infinite succession of ethers, each constituting the elasticity of its predecessor, but to suppose these atoms, the ultimate elements of all material forces, to be endowed by the Almighty with repulsive power when He said, "Let light be !" Thus, in Dr. Robinson's view, the only tenable supposition is that with which the passage just cited concludes, namely, that the atoms of the ether have been endowed with repulsive power by the Creator. Professor Challis, in the remarks which he did me the honour to make on my paper of last year, states that he at one time inclined to the theory of successive ethers, but has since abandoned it. The theory finally adopted by him may be found, given in his own words, in p. 79 of the number of the journal of the Victoria Institute for March, 1881. On referring to that place it will be seen that he does not admit that the etherial atoms are endowed with repulsive forces. He holds that after having arrived (as he has done by his mathematical researches) at the conclusion that the pressure of the ether is proportional to its density—in other words, that it is equal to its density multiplied by an ever-constant factor—we have taken all the material agency into account ; and that the constancy of that factor—the only thing not accounted for by such agency—owes its origin to non-material agency, i.e., Mind : and that this is quite in accordance with the well-known fact that while sound, light, &c., are, in one point of view, material conditions, our *perception* of them can only be accounted for by admitting that there must be a non-material or spiritual agency also.

Again, Dr. Robinson says :—"With respect to the Conservation of Energy it seems to me that the statements about it have not been weighed with sufficient care. It is by no means generally true that one form of energy can be immediately transformed into another. For instance, every writer or lecturer nowadays talks of magnetism being converted into electricity and *vice versâ ;* but this is not the fact. A magnet may stay beside a wire for ever without producing any signs of electricity ; but if it be moved to or from the wire a current appears, the intensity of which is found, even on the largest scale, to be in exact proportion to the moving power expended. Again, chemical affinity can produce electricity, light, and heat ; but not magnetism. And even in this case motion is necessary to bring the combining bodies into contact ; and as to the greatest and most universal of all forces—gravity—it, as far as we know, cannot be transformed into any other form of energy. . . . These and similar matters make me think that in the transformation of forces we have not got to the bottom of the matter ; and it must be kept in mind that very often the ultimate agent in the transformation is human will,—for example, setting an electric generator in motion or charging a battery. And this fact might lead us to a far wider and more elevated conception of the universal influence of the highest of all wills (that of the Creator), as connected with the absolute existence of energy itself."

Unless I could boast of such an acquaintance with the whole range of the physical sciences as Doctor Robinson himself possesses, I should consider myself presumptuous were I to offer any opinion on these views in detail. But I think it will be at least admitted that he has brought forward some good reasons for refusing to look upon the doctrine of Conservation of Energy as having become fully and finally established.

APPENDIX B.

Second extract from Dr. Romney Robinson's letter :—

"I have a great dislike to the words 'Nature,' and 'Nature's Laws.' The first we got from the Romans, and I fear that something pagan still clings to it. It is too often spoken of in common parlance as a power that rules the world. Even a man like Darwin is guilty of an abuse of words when he talks of *Natural Selection.* Selection implies intelligence, will, and power of action. Nature possesses none of these, and even Mr. Wallace felt the absurdity of the phrase and replaced it by 'the survival of the fittest.' Darwin went so far (if my memory does not deceive me) as to say that the wonderful eye of the mammal was created or formed by *Natural Selection* out of a streak of pigment possessed by some supposed primordial ancestor. He does not say how that ancestor got that streak.

Nullum numen habes si sit prudentia : Nos te,
Nos facimus *Natura* deam, cœloque locamus.*

"As to its laws, I would only add that they are no laws at all. Take for example the so-called law of gravity ; it is simply an expression of the observed fact, that masses of matter act on each other at a distance with forces proportional to the sum of the masses divided by the square of the distances between them. We find that this holds good for terrestrial bodies, for the sun and his planets, and a few double stars. But beyond that we can affirm nothing except by conjecture. *We* might call it a law because we believe it exists by the decree of a Supreme Lawgiver. But the phrase would be absurd in the mouth of an atheist."

A. McArthur, Esq., M.P.—I rise to move "That our best thanks be presented to the Right Hon. the Lord O'Neill for the Annual Address now delivered, and to those who have read papers during the session." (Loud applause.) A very pleasing and a very easily-acquitted duty falls upon me. I am requested to move that our best thanks be presented to Lord O'Neill for the Annual Address he has just delivered. His Lordship has already received the thanks of the meeting, and I am quite sure that all who have heard the paper we have listened to will very cordially agree with this motion. I wish to express my own very great pleasure and profit at listening to the address, and I beg to move the motion that stands in my name.

Rev. R. Thornton, D.D.—After the admirable example of brevity which Mr. McArthur has set, I must not detain you many minutes ; but still the great satisfaction I feel in regard to the paper we have just listened to—and I entirely acquiesce in the feeling and tone of that paper—leads me to trespass upon you for a little longer period than Mr. McArthur has done. I am very glad indeed to find that Lord O'Neill has followed the sound system which I believe I myself introduced into this Society, of fighting the enemy, and of meeting him face to face on his own ground. A long time we had to be a little apologetic ; we were obliged to show our

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* In these lines, quoted from the Tenth Satire of Juvenal, the word "Natura" is substituted for "Fortuna."

raison d'être. Then the tide turned. I believe I was the first person who put on the gloves. Lord O'Neill grapples fairly with the question. We are now told that the supernatural is incredible, and everything is natural. "Well," Lord O'Neill says, "what is the natural? What do you mean by the natural?" And he clearly shows, I think, that beyond the region of sense there is something—a reason-sphere, or whatever you please to call it—into which the intellect of man may penetrate. I am sure we must all be very glad indeed to find that he has had the courage to grapple with such a subject, and hope that this is not the last paper we shall have from him upon so interesting a matter. Therefore I may fairly ask you to accord your best thanks to Lord O'Neill for his very interesting, and well-reasoned paper. (Cheers.) But there are others to whom we have also to return thanks. His paper is one of many. "Micat inter ignes luna minores": if we can call them *minores.* If you look at the list of papers contributed, you will find that those papers have not only been diversified in character, but extremely valuable in point of matter. Some have been upon geological subjects, and I am very glad that we have had such papers, which have shown that the Mosaic cosmogony is not affected by mere scientific hypotheses. As Sir Joseph Fayrer has well and truly told us, science is one thing, and theology is another. They are twins, but still they must not be regarded as exactly one and the same. As long as we are content to let science take its right position, and theology and religion their right positions, there can be no antagonism. Whenever we introduce theology into science, and science into theology, we shall most assuredly get into terrible confusion. Let us remember, as we have been told to do, that scientific men are engaged in the pursuit of truth, and that we theologians—here I speak for myself as a professional theologian—are engaged in the pursuit of truth also. Do not let us say that we are antagonistic to one another. Let us still show that we are both engaged in the pursuit of truth, one in one direction and the other in another. Depend upon it the time will come when we "shall know as we are known," and when we shall see, although at the time we did not know it, that we were all tending towards the same point. (Hear, hear.) I have only to say that I second the resolution with great satisfaction.

The motion, having been put, was carried by acclamation.

Lord O'Neill.—I beg to express my sincere thanks for the kind reception my paper has met with—a reception going far beyond what I could possibly have expected. I may here say that a book has come to my knowledge within the last few days which, had I seen it sooner, would have aided me very much in what I have done, and that is a work written by Dr. Wainwright, entitled "Scientific Sophisms." I have had time to look into it sufficiently to enable me to say that I think it a most valuable contribution to the literature which it is the endeavour of this Institute to encourage. (Hear, hear.)

Admiral E. G. Fishbourne, C.B., R.N.—I have to propose a vote of thanks to our noble President, and I do so with great pleasure, knowing the immense support he has been to this Institute. (Cheers.) I question very much whether it would have been in existence if he had not thrown himself as cordially as he did into its work by consenting to take the position of President. But we are not only indebted to him for his past services, but also for his presence here to-night, and I am sure you will accord your thanks to him with all the more sincerity when I tell you that this is the third meeting he has attended to-day. (Hear, hear.) His Lordship took the chair at a Harrow meeting this morning; he subsequently occupied a similar position at a meeting in behalf of the Zenana Mission; and he is now here, presiding over this meeting. (Cheers.)

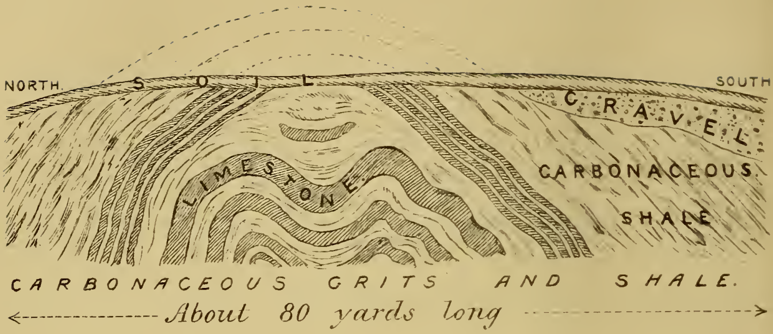
Rev. F. C. Cook, D.D.—I almost owe an apology to the meeting for taking upon myself to say what every member of this Institute would have said with equal sincerity, namely, that I have great pleasure in seconding the vote of thanks to our noble President. He has been permitted to see many of the societies he has founded arrive at a mature and healthy age, and must be rejoiced to see how this Institute has increased and prospered under his presidency; but at this hour of the evening I will not take up the time of the meeting by saying anything more than that I am glad to have the opportunity of seconding the motion.

The motion was carried amid general applause.

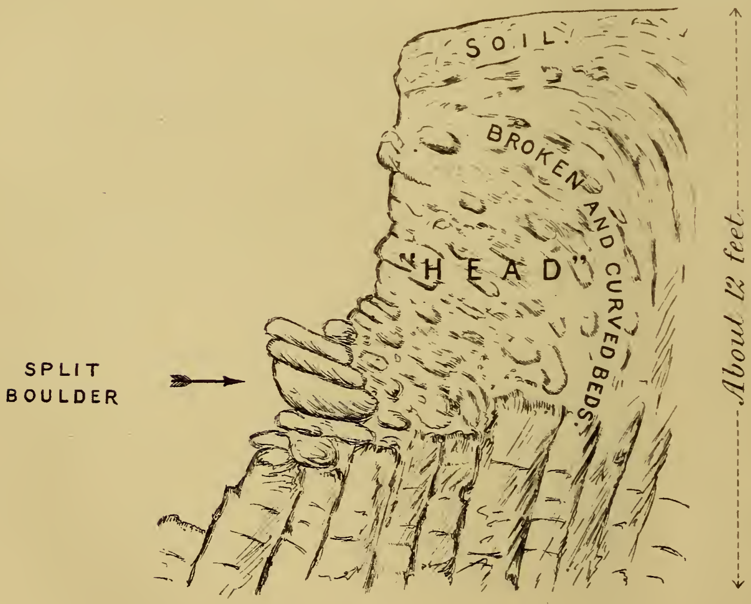
The President.—It has been my lot very frequently to receive a vote of thanks for presiding in this chair, and I have often thought it my duty to say that I did not deserve anything of the kind, inasmuch as I do not think I am "the right man in the right place." I accepted the position of President only because I was one of the founders of this Institute. I remember the time when, in a back room in Savile-row, Mr. Mitchell delivered an Address to a very scanty audience, and it was from that small beginning that this Society has gone on until it has attained its present proportions. But still the Institute is not indebted to me in any way, either for my exertions or scientific attainments, or for any fitness I may possess, to occupy such a post. I can only attribute what the Institute has been pleased to do with regard to myself to the old habit which is so essentially characteristic of Englishmen. We are so very conservative that we cherish even an abuse for a long time, and do not give it up until it is positively wrenched from us; and this is the only ground on which I can conceive why I have retained the occupancy of this chair. I must, however, congratulate you on the progress the Institute has made, on the great effects it has been enabled to produce, and the constant persevering and patient way in which it is holding on its course, and will, under God's blessing, be enabled to resist a great deal of the error and mischief with which at the present day the opponents of the truth are deluging the land. Our noble lecturer, Lord O'Neill, at the end of his Address this evening, urged very strongly that both young and old should study the works of Paley and Butler. I have been told that in the universities the works of my ancestor, commonly called "the characteristic Earl," are now much more studied than the works of Paley and Butler. I am sorry to hear it, for a greater "prig" in literature I do not believe to have existed. (Laughter.) I have attempted to read his works very frequently: I have dipped into them one after another; but have never had sufficient strength of will and courage to go through with them; they are so full of conceit and pretentiousness. At the time at which he lived a certain ornate style prevailed, and I believe that his acceptance was owing a good deal to the fact that it was unusual then for men of his rank to deal in such matters. But I must say that in my opinion, if the man who could lay down as a broad proposition that ridicule is the test of truth—which is the proposition laid down in his works—can be called a true and trustworthy philosopher, I am bound to say that I view with dismay those intellects and hearts that have taken to the study of the works of my ancestor, and rejected those of Paley and Butler. But as brevity is the order of the night, I will not further detain you. I should get out of my depth if I began to talk on scientific matters. I can only say that I have a positive reverence for science; and if I had not been called away to other things, I should have given myself to the study of science, because whenever I hear a scientific discussion I lick my lips with enjoyment. But I made my choice in another direction, and consequently I feel that I am hardly fit to hold the post I now fill; but to your consideration and kindness—and probably to some respect for me, as having been at the outset one of the very few who started this Institute—is owing the fact that I now continue to retain my position as your President. (Cheers.)

[The members, associates, and their friends then adjourned to the Museum, where refreshments were served.]

BRITISH MUSEUM



Section of a Lime Quarry at Bickington, N. Devon, showing the Limestone beds in contorted Carbonaceous Grits and Shale, the hill planed down (by glacial action) and Drift Gravel deposited on the south.



Section of the Cliff at Westward-ho! N. Devon; showing a boulder of blue Carbonaceous Grit, *Split* and *Faulted* by the down hill pressure of the *Ice Sheet*

ORDINARY MEETING, APRIL 11, 1881.

H. CADMAN JONES, ESQ., IN THE CHAIR.

The minutes of the last meeting were read and confirmed, and the following elections were announced :—

MEMBER :—H. B. Guppy, Esq., M.B. Edin., R.N., Falmouth.

LIFE ASSOCIATE :—Rev. C. Hebert, D.D., Ambleside.

Also the presentation of the following works for the library :—

"Proceedings of the United States Geological and Geographical Survey." *From the same.*
"The Writings of Swedenborg." Rev. A. Clissold. *Rev. T. M. Gorman, M.A.*

The following paper was then read in the author's unavoidable absence by his son, Mr. H. Michell Whitley, C.E. :—

THE SUPPOSED PALÆOLITHIC IMPLEMENTS OF THE VALLEY OF THE AXE. By NICHOLAS WHITLEY, C.E.

ONE of the most recent finds of the so-called stone implements of "Palæolithic man"—that at Broom, in the valley of the Axe, about three miles N.E. from Axminster, is the most important, as showing their geological, and not their artificial, origin. As a large number of specimens have been found at this place similar to the so-called "Axes" from the drift of the valley of the Somme, and as a long and high section of the gravel-bed there is now in full working, the origin of this gravel may be read with a greater amount of certainty than that of former discoveries.

The discovery at Broom came about in this manner. Waiting at the Queen-street railway station at Exeter on the 12th of October, 1876, for the train, I observed that the railway was ballasted with chert gravel of a peculiar form, and a search of a few minutes produced two rough "tools" of the Somme type, and at most of the stations eastward as far as Basingstoke, among similar gravel, similar forms caught my eye. On arriving in London I wrote a letter to the *Standard*, in which I drew the conclusion, that if the asserted tools from Brixham Cavern and from the drift-beds were implements, then the South-Western Railway was ballasted with flint implements from Exeter to Basingstoke, a distance of at least 110 miles. This letter was replied to by Mr. S. G. Perceval, of Beer, and by Mr. P. O. Hutchinson, of Sidmouth, both asserting that no palæolithic implements had been found at Broom, or in that neighbourhood; and Mr. Hutchinson intimated that I had been blinded by seeing with my own eyes, and deceived by judging by my preconceived prejudices. The result, however, proved that both my eyes and my head were faithful to the trust which I reposed in them.

Mr. D'Urban, the intelligent Curator of the Albert Memorial Museum at Exeter, seeing the published letters, instituted a search of the ballast of the railway and the gravel-pit at Broom; and with the aid of the workmen obtained about fifty "implements" of the drift type, which are now in the Exeter Museum. Several of these flints from the ballast of the railway are stained with the oil dropping from the locomotive engines in passing over the line.

At the meeting of the Anthropological Institute, on the 9th of December, 1879, "Mr. Worthington G. Smith, F.L.S., exhibited a series of sixty 'palæolithic implements,' principally from the Valley of the Axe." The President, Mr. E. B. Tylor, remarking that,—"For the rude and heavy palæolithic type of instruments [*sic*], the specimens now exhibited showed the local chert to be a tolerable material, though quite unsuited to the finer flakes and arrow-heads of the Neolithic age." I have obtained several of these "implements," which I now exhibit; it will be seen that they vary much in size and in form; that there is no "secondary chipping" on their edges, but indications that the edges have been bruised by being rolled in the gravel.

I have inspected this gravel-pit at Broom on two occasions,—the slopes of the hills on each side of the valley, and also the gravel on the hill-tops. The pit is an open excavation into a mass of chert-gravel, which forms the lower slope of a spur of a hill on the eastern side of the valley; it has been excavated to the level of the rails, and exposes a perfect section of the gravel from 20 to 30 feet in height, over a distance of from 200 to 300 yards. The gravel is mainly composed of fractured angular pieces of salmon-coloured chert (the flint of the greensand) confusedly mixed with sand, and covered with the same loam and soil which coats the slopes of the hill-sides above. The "implements" are mainly obtained from near the base of the bed; as is also the case in the gravel-beds of the valley of the Somme.

On the west side of the valley on Coaxton-common I found long rough pieces of fractured chert, in colour and form similar to the so-called implements found on the surface of the greensand at Grand Pressigny, in Central France; showing that the same form of "implement" is found in the same geological bed, and indicating a natural rather than an artificial origin.

On the surface of the arable land, about a mile east of Axminster, I found many perfect chert "cores" (from which flakes are supposed to have been struck by man), but few perfect flakes; this peculiarity, however, arises not from human design, but from the nature of the fracture of the stone itself, as "chert differs from pure flint in breaking with a square splintery fracture, instead of a conchoidal fracture,"* again indicating a natural rather than an artificial origin for these "cores." Thus, in both cases, there is no evidence of the skill of man overcoming the intractable nature of the material.

I have called these broken pieces of chert from the ballast-pits *implements*, for the convenience of indicating that they are similar in form to those which, from other sites, have been dogmatically asserted to be implements made by palæolithic man, and on which the whole of the direct evidence in support of that mythic creature at present rests; but a consideration of the geological evidence in this case strongly leads to a contrary opinion, as the origin and geological history of the chert gravel is so stamped on the surface of the country, that it can be read with an amount of certainty not attainable in former cases of this kind.

As the pure flint is found in the upper chalk, so the less pure chert is mainly found in the upper greensand; and the greensand beds cover an area of at least 500 square miles in the West of England. The flat-topped hills of this formation rise to a height of 900 feet above the sea at its northern extension, and southward on the coast line to about 500 feet.

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* Bristow's *Glossary of Mineralogy*,—Chert.

Viewed at a distance from the west, this land has the appearance of a sloping plain of marine denudation, falling 400 feet to the south; all the principal valleys flow southward to the English Channel, and show conclusive evidence of having been excavated by a great denudation to a depth of from 300 to 500 feet, destroying in some parts the continuity of the strata, and leaving isolated patches of greensand at a considerable distance from the general mass. The finer materials of sand and clay were by denudation readily transported to the sea, while the solid and heavy blocks of chert remained on the surface of the denuded land. Then followed the glacial age, with its thick masses of land ice, planing and rasping the rugged face of the ground, and crushing and flaking the nodules of flint and chert by its weight and downward progress, and forming those gentle curves on the outline of the landscape, which constitute its chief beauty. Then came the pluvial period of excessive rainfall, mingled with land-floods from melting ice, which re-arranged the gravel beds, leaving large masses on the flat hill-tops,—sweeping other portions from the steep hill-sides to lower levels, and forming the thick gravel beds which now border the more recent alluvium of the valleys. Afterwards the whole country appears to have sunk beneath the ocean, and when it re-appeared, after its baptism, and the turbulent waters slowly retreated from off the surface of the ground, the beat of the waves, and the prolonged tide-washing in shallow water, left a blessing behind them, by depositing first the clayey subsoil, and then the less heavy but more fertile soil, thus rendering the land a fit abode for the last and best of all God's works.

In order that this outline of the latest geological changes of the surface of the country may not be considered as a picture drawn from the imagination, I will lean for support on the high authority of the late Sir Henry De la Beche, Director-General of the Ordnance Geological Survey, who, describing the greensand of the West of England, says:—"The whole country is more or less traversed by faults. Gravel covers all the hills, and is most frequently composed of unrolled flints and fragments of chert, which do not appear to have been transported any great distance, but to have resulted from a dissolution of the chalk and greensand in place, leaving the upper surface of the chalk or greensand, as the case may be, corroded and uneven."*

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* *Sections and Views illustrative of Geological Phænomena*, by H. T. De la Beche, p. 5.

I cannot refrain from quoting further the remarkable concluding paragraph of Robert Chambers, who, in his paper on "Ice and Water," says:—"On the whole subject of the Superficial Formation, I am disposed to make one concluding remark. I desire to refer to the broad fact, that, in the regions of the earth where soil can least be dispensed with, there should have been a peculiar agency at work, which secured the very general diffusion of soft matters over the hard surface. The warm parts of the world have large growth from little soil; but if the parts north and south of the fortieth parallels had been left to only such influences as the air and water, they might have been so meagerly furnished with the needful matrix for vegetation, that little population could have there existed. As it is, we have clays, and sands, and gravels, and mixtures of all three, spread in deep beds, very generally over the temperate regions, so as to insure ample material for the agriculturalist to work upon. In the present state of the subject of final causes, I suppose it would be held as rash to say that all this was a matter of design; but I feel at least inclined to say that, if it was not from a premeditated plan of the Almighty Creator of the worlds, it looks marvellously like one, just as the existence of coal and other minerals does, and I do not see that we can be far and fatally wrong if we feel thankful for it accordingly."*

Thus, the origin and history of the gravel beds appear to lead irresistibly to the conclusion that the "implements" (if a constituent part of gravel) had a geological, and not an antiquarian, origin. And this conclusion is supported by an inspection of the exposed section of the gravel bed, which shows that the "implements" and gravel are similar in the nature of the stone,—are embedded in the same matrix,—show the same kind of fracture, and have been subject to the same forces, both in kind and degree, as the angular chert gravel in which they are found. Thus, we must infer that the implements do constitute a true part of the gravel itself, and that the natural agents which split and fractured the mass of the gravel, also split and fractured the selected pieces of chert, which have been dignified by the name of implements. If, on the other hand, we come to the conclusion that these fractured pieces of chert are implements made by human hands, then we cannot escape from the inference, that men existed in great numbers before the formation of the present cultivated soil, and before the final close of glacial catastrophe.

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* *Ice and Water: a Review of the Superficial Formation*, p. 41.

In former papers, read before this Society, I have pointed out that the true flint implements of the Neolithic age show the same kind of evidence of wear, by use, as that of a well-worn chisel or a wasted ploughshare; and that, though I have inspected at least a thousand "drift implements" of the Palæolithic age, in England and France, I have not seen one bearing the same authentic evidence of use as is impressed on the true stone tools of the Neolithic age; and later discoveries, as well as this at Broom, confirm the opinion that such evidence does not exist.

But further, the skill of all savage tribes hitherto discovered is wonderfully exhibited in the design and carving of their implements of war and the chase. This is well exemplified in the various tools and relics of man obtained from the lake dwellings of Switzerland, and our museums are crowded with overwhelming evidence on this point. But these fractured pieces of chert from Broom show no indication of any manipulative skill, or bear the impress of any intellectual thought.

The chert gravel beds, at the foot of these greensand hills, extend, throughout all their windings, over a distance of at least two hundred miles; the gravel is of the same nature and fracture everywhere in the district; the geological causes which operated on it must have been everywhere the same, and we may therefore expect to find similar results in the fractured forms of the gravel; especially as during the erection of the telegraph-posts between Chard and Axminster similar "drift implements" have been discovered, four of which are now in the Blackmore Museum. The "drift tools" at Broom have been found after the rate of 2,000 to a mile, which for a distance of 200 miles gives an estimated quantity of 400,000 tools for the gravel beds at the foot of the hills only.

From the gravel beds of the valley of the Somme thousands of these drift "tools" have been exhumed. The valleys of Norfolk and Suffolk are loaded with gravel beds, in which these drift "implements" are so abundant that hundreds have been dug out of a single pit. And over a period of at least twenty years, numerous antiquaries have collected untold numbers of these splintered flints; and at the present time, notwithstanding all the abundance of the discoveries, and the labours of extended research, not a single bone of man's frame has been found in the drift gravel, or any other authentic relic indicative of his presence, to confirm the bald supposition that these flints are human implements.

Further: much of the evidence which had been prominently put forward in support of the high antiquity of man has, during the past few years, been completely abandoned. Thus:—

The Abbeville human jaw from the gravel of the Somme is acknowledged to be "a plant."

The palæolithic "beads" of St. Acheul are found to be organisms of the chalk.*

The human bone from the Victoria cavern, which Professor Boyd Dawkins once described as "establishing the fact that man lived in Yorkshire before the glacial period," and who added, that "the man to whom it belonged was probably devoured by hyænas,"† has now been pronounced to be the bone of a bear; ‡ and a "cut" bone, said to have been found in an undisturbed layer in association with the extinct mammals in the same cave, belongs to a domestic sheep or goat, both of which were unknown in Europe before the Neolithic age.§

Some of the artistic drawings upon the fossil bones found in the Thayingen Cave in Switzerland, are now pronounced to be spurious, and the result of intentional deception. The same drawings are contained in a work published six years before the discovery of the cave.||

The reputed discovery of relics of man 800 feet deep in a Miocene deposit at the Dardanelles, by Mr. Frank Calvert, is now utterly rejected.¶

The supposed dressed flints from Miocene beds at Theney,** the "worked" flints from the Pliocene beds of St. Prest, and the supposed basket-work from lignite, in Switzerland, have all broken down under a searching examination.

And I claim, on the evidence adduced in former papers read before this Society, to have stamped out the evidence of Palæolithic man from the "famous" cavern of Brixham. But above all we are indebted to the Woodwardian Professor of Geology at Cambridge for the important statement,—that the evidence for the antiquity of man "has completely broken down in all cases where it has been attempted to assign him to a period more remote than the post-glacial river gravels."††

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* *The Geologist*, vol. v., p. 234.
† *Cave Hunting*, p. 411.
‡ *Journal of Anthropological Institute*, vol. vii., pp. 159, 183.
§ *Early Man in Britain*, p. 187.
|| *Nature*, November 30, 1876.
¶ *The Epoch of the Mammoth*, p. 32.
** *Journal of Victoria Institute*, vol. xiii., p. 319.
†† *Ibid.*, vol. xiii., p. 327.

Thus, rejecting secondary and inferential evidence as inconclusive, the only direct evidence in support of the high antiquity of man, is limited to one single inquiry,—*Are these rough-splintered flints from the drift gravel implements made by man?*

This question is more fully answered by the discoveries made in the valley of Axe than by any heretofore, the main object and point of this paper being to show that these supposed implements had a geological and not an antiquarian origin; that they have been fractured in the same manner as the angular gravel in which they are found, and by the same natural cause; and that there is in addition a preponderating weight of evidence against the assumption that they are implements made by human hands.

The two Geological Sections illustrate the effects of what appears to be glacial action in North Devon.

No. 1 is a section of the side of a lime quarry across the strike of the beds at Bickington, near Barnstaple. It shows that the former surface of the land has been denuded and rasped down by glacial action from the north, and drift gravel deposited on the south slope of the hill. (From my Sketch Book, 1852.)

No. 2 is a section of the cliff near Westward Ho! Bideford Bay. It shows the effects of the pressure of land ice in its progress down the slope of the hill, bending and crushing the upper ends of the perpendicular carboniferous beds; and in particular splitting and faulting along the lines of lamination, a large boulder of blue carbonaceous grit. The broken and bent edges of the up-turned strata throughout Devon and Cornwall show similar evidence of ice-action. (The section is from my Sketch Book, 1868.)

The **Chairman.**—I have to return the thanks of the meeting to the author of this interesting paper, and to his son, who has so ably read it.

Mr. J. **Rendall.**—There are one or two questions which I should like to ask. With regard to the first paragraph on page 2, I would say it strikes me that, when engaged in investigating the authenticity of these flints as being implements, it is rather a dangerous plan to apply to the workmen engaged in the places where such things are found, to furnish them, because there is little doubt that, if they can make the flints look a little more valuable by any process, there is a direct temptation to them to do so. I do not quite make out whether the next paragraph means to state that the flints now on the table were among the implements to which Mr. Smith referred as being palæolithic, or whether it is only meant that they are similar; because the author of the paper says that Mr. Smith "exhibited a series of sixty 'palæolithic implements,'" and then, having quoted a remark of the President of the Anthropological Institute, he goes on to say,—"I have obtained several of these 'implements,' which I now exhibit." Does he mean that Mr. Smith and Mr. Tylor have spoken of those flints on the table as being "palæolithic implements"? Then, with regard to what is said on page 40, I have never had the opportunity of seeing any of those results of human industry which have come from the Lake dwellings in Switzerland, except the few that are in the British Museum and in the Christy Museum. It has not struck me, in looking at those specimens, that they do exhibit any great indications of manipulative skill or intellectual thought. They seem to me the rudest things, on which no great amount of skill has been exerted. I do not mean to say they do not indicate the labour of human hands; on the contrary, I think they do; but I have not been struck with their displaying any great amount of thought or of manipulative dexterity. In another paragraph on the same page, there seems to me to be very much like an over-statement of the case in asking any such Society as this to suppose that persons in positions of reputation, and who are supposed to be possessed of some ability, could possibly take for "palæolithic implements" things that have been found over a large area at the rate of 2,000 to the mile. You may easily get out of a great number of specimens one or two as to which you may entertain doubt; but to take flints discovered at the rate of 2,000 to the mile, and to treat it as doubtful whether all are to be regarded as "palæolithic tools," seems to me to be reducing those who think that *some* are palæolithic and *some* are doubtful implements, to a position of absurdity, which can only be regarded as an over-statement of the case. Fancy 400,000 palæolithic tools in a distance of 200 miles! Does any one in the world suppose that all flints so found could possibly have been palæolithic implements? I cannot believe it. I should like Mr. Whitley, who has read this paper to us, to say what he or his father thinks about the antiquity of the specimens we have all seen at the British Museum and in the Christy Museum,—what he thinks of those carvings done on bone, and the other specimens. Does he think they are all fraudulent? And, if not, does he doubt their being human work? It has always seemed to me, in looking at those specimens, that there is one thing about which there is great doubt. You there see a large number of chisels or axes. Those things have been picked up, as the labels tell us, by some one, here or there. How do they know this? Of course you may give credit to the curators of museums for not being inclined to take part in a fraud; but what is the evidence? Take those drawings on bone that are found in the Christy Museum. Where is the evidence as to their having been found as stated? They have been accepted by a number of persons as genuine, and then up comes some person who knows more about the subject and says the things are a fraud. It seems to me that all these things ought to be taken with great caution, and that there ought to be a history and pedigree along with each, so that they should not be generally accepted for a great many years, and then characterised by some one as not genuine. It strikes me that there is much want of the missing link between the instruments as they are brought before the eye of the public, and the historical verification of the antecedents of those things which are produced to prove a human antiquity of many scores of thousands of years.

Dr. T. Colan, R.N. (Deputy Inspector-General of Hospitals and Fleets).—In reference to the point as to the antiquity of the Stone age, I should like to say that I have known of men in the present century who practise the art of making stone implements. It was my lot to be Fleet Surgeon in the last Arctic Expedition, which, it will be remembered, got within 400 miles of the North Pole. While on that expedition, I inquired into the habits of the Esquimaux, and I found that in the coffins of their dead they placed stone implements, such as arrow-heads. It is well known that the persons with some of whom these things were buried existed within the present century; that some of the persons thus intombed were the immediate forefathers of the existing generation; and that the reason they used these stone implements was that they had neither bronze nor iron. In the part of the world they inhabit, there are no means of inventing bronze and no chance of finding iron; so that the Esquimaux, from time out of memory, have been forced to use stone implements. In fact, in many places they have no wood, and in the Northumberland Straits, where they have to go very far to find wood, it is a great kindness to give them the oar of a boat, or any other piece of timber, out of which they can make arrow-stems. They are so hard up for wood, and so little drift wood is found in some parts of Smith's Sound, that the Esquimaux there, when they have shot a reindeer, or any other animal, with one of their wooden arrows, will pick out any broken pieces of the arrow and splice them to the other part of the shaft. I have merely mentioned this to show that at the present day when we in England, after nearly six thousand years of man's existence, are making use of mixtures of all kinds of metals, there is existing in another part of the globe a race of human beings who have actually within the last few years been using nothing but stone, and they, too, a people not at all devoid of intelligence. The Esquimaux are men of the highest type of barbarous intelligence,—if I may use such a phrase,—men who, if they had had the opportunities of inventing bronze, would have done it, and who, had there been iron to be found in their country, would have made use of it. The only iron they have found in the country is a sort of iron-stone, which they use to strike fire with. They travel long distances to get at the mines where the iron stone is found, and, when they have got it, strike two pieces together so as to obtain a light, which they apply to the Greenland moss forming wicks, which they float in the oil of the seal, &c. I think these facts are sufficient to show that we need not go so very far back to prove that there has been a Stone age,—that the Stone age is not so remote as some people imagine; but that it is actually within the knowledge of the Arctic Expedition of only a few years back in the present century.

Mr. S. R. Pattison, F.G.S.—My old friend, Mr. Whitley, appears to perform the same functions in regard to this branch of science and knowledge that Lord Eldon did in regard to the law. I have some knowledge of what Mr. Whitley has done in other fields and, about two months ago, I went to the place mentioned in this paper—Broom, in the valley of the Axe,—with the object of endeavouring to discover some of those implements, or tools, supposed to have been fashioned by the hand of man. I was, however, wholly unsuccessful. I spent a long afternoon, and think I thoroughly investigated the deposit, which is accurately described in this paper as a tumultuous assemblage of chert, split into small junks and angular fragments, and admirably adapted for that kind of nature's cutlery which people use when they are driven to the necessity by not having metals ready to hand. Just such a place and deposit would be selected by any of us if we wanted a sharp implement, for digging or other purposes, supposing we had no other material. There is a tall cliff, forming the end of a plateau above the valley, projecting just where one of the side valleys comes into that of the Axe. It is extremely difficult to understand how the accumulation could have been formed by present causes, unless we included an almost inconceivable amount of time, of which there is no evidence. I was quite of Mr. Whitley's opinion that there were no flint implements visible. A remark has been made in reference to the workmen, and I remember saying to those I saw, "I am very desirous of getting one of these things." They said, "We cannot furnish you with one, because there have been none found for nearly twelve months." I said, "could you not make them?" The answer was, "Oh, no!" I asked, "Don't you think some of them were made?" and the reply was, "I dare say it would be very easy to make them; but those we found were not made. We had no time to make them, but we did find a good many of them; they have not, however, been found lately." The flints referred to were found in the lower stratum, and they showed me where. Now, this is some slight proof as taken from the men who handled these things, that there is a difference between the things to which human origin was assigned and the mere flakes and pieces naturally fractured. I can therefore accept all that Mr. Whitley states, without accepting his conclusions. It is just as if he were playing a game at skittles, in which he undertook to knock down every pin, but in which, according to the laws of the game, unless he succeeded in knocking down every pin, he really accomplished nothing. If one of the stones brought from the Valley of the Axe exhibited undoubted proof of design, and therefore of the mental application by man, his whole argument at once becomes utterly worthless, and, so far as it tries to prove a negative, is fallacious. I did not go on to Exeter, where I before saw rough flints said to have come from the Valley of the Axe, and attested by Mr. Evans, who is the prime expert in these matters, and by others who have made observations upon them, to be not the same as implements admitted to be of human origin. They are exhibited there to show, not so much that they are human implements, as that they form a portion of a deposit from which human implements might be struck, and in that view they are interesting. I cannot conceive any one putting forth the hypothesis that these things are of human origin; they are merely fractured stones, like other fractured stones; but this does not upset the conclusions drawn from one or two that have had a different origin, and, unless we are prepared to give up all evidence or reasoning on these matters, we are bound to accept as genuine the implements of the palæolithic age which are claimed by the experts to be of human origin. The first speaker has asked where is the proof that these things are genuine, and has spoken of the necessity of pedigrees. The pedigree of the things in the late Mr. Christy's museum is well assured; Mr. Christy, besides being conscientious, was a very good observer, and so was his friend, M. Lartet. Both had been taken in by frauds and impostures, and had become very cautious, and the result was that they received only as genuine things which were taken out under their own eyes, and then they saw the labels pasted on them with the names and dates. The same plan was followed by Mr. Evans, in the Blackmore Museum, and by Mr. Prestwich, at Abbeville; so that all these things can be traced by an exact pedigree to the locality and the source whence they came. Just as there is capability of proof for everything that came from Mycenæ, Troy, and Pompeii. With regard to the story these things tell in reference to chronology, I do not feel prepared to go into that matter fully at this hour. I have said the accumulation of the Axe Valley was one going entirely beyond the reach of present causes; but they are accumulations which may have taken place since man has come upon the earth. As a similar instance I may mention that I was the other day at the Bluffs of the Missouri, and high up those Bluffs, towards the interesting regions of the Dakota territory, far above the height to which man can now reach, in a position to which it would be very difficult, if not impossible to climb, inscriptions are written in a picture-language unknown to any of the existing tribes of North American Indians. This is of a piece with the evidence we get all over western Europe to the effect that, since the advent of man there has been at least one great physical change, which, whether slowly or rapidly produced, has amounted to something like a cataclysm. There have been very great changes of this kind; and, feeling that this has been the case, I have no difficulty with regard to the age of those implements, which were made and deposited antecedent to the occurrence of that cataclysm. The time antecedent to the latter must have been that during which men dwelt on the earth, as these things prove. It is impossible to show that some four or five thousand years would have been insufficient to have effected all this. We have no historical testimony against such an opinion, nor have we any geological facts against the supposition. Some five thousand years ago, man may have come on our shores, then outskirts of the known world, and lived just as man does now in some parts of North America, Africa, and elsewhere, and used the kind of flint implements which are or were quite recently in use among the Esquimaux and other tribes. There may have been similar things going on in Syria and Egypt, and elsewhere, preceded by civilisation in some other locality, followed by physical changes and alterations produced by floods, ice, and so forth, producing the facts we now find. We have evidence of the facts of the occupation, of the disturbance, and of the subsequent settling down at the present level. We know the present causes to be very inconsiderable, and such as do not interfere with the regular occupations of mankind, and we infer without fear of contradiction that the former causes were more intense for the time. For my part, I do not see any reason for stretching one's belief, or being eager about the establishment of the fact that the flints in these gravels are not human implements, and, when I see things that are as evident tokens of workmanship as are the decorations of this room, I have no more hesitation in accepting the one than I have in believing the other.

Mr. T. K. Callard, F.G.S. — I think it rather difficult for any one to know when he has got a flint implement. I have brought from the Somme Valley certain forms of flint, and shown them to experts, who have said, "Some of them are implements and some are not." Those which are received as implements are not much more like implements than the others. That they have something of the form which would give one an idea or first impression that they had been made by design I have never disputed; but when I have looked at the evidence all round I have found much that points in an opposite direction. Of the flints now on the table I should at once reject all but about three, and I should hesitate even about the three. There is a remark on the second page of the paper about which I should like to ask a question. The author says, "It will be seen that they vary much in size and in form; that there is no '*secondary chipping*' on their edges; but indications that the edges have been bruised by being rolled in the gravel." Now, I should like to know whether that remark applies only to the flints now before us, or to all the sixty flints which are said to be implements, and which were exhibited by Mr. Smith? This is a very important question, because, on a former occasion, in this room, I produced two specimens of spear-heads. Professor McKenny Hughes, who is an expert in flint implements, at once recognised one, that which I have in my hand, as of human workmanship. Now, some of those before me look quite as much like human workmanship as it does. I then showed him another, which I now produce, and Professor Hughes said, "I recognise this piece (the first) as the work of man, from the combination of blows that have produced a form generally associated with man's handiwork. With regard to this other, I do not know how it has been produced, but it is certain that nature alone has been at work here. In the implement which I say is the work of man, I find that blows have been delivered all round the edge, with the evident and definite design of producing the form." Now, if I look at the two forms, this, the rejected one, certainly seems to me as much like a spear-head as the other. I want to know what it is that determines which is a true implement and which is really the work of nature? Professor Hughes, says, "In the implement which I say is the work of man I find that blows have been delivered all round the edge, with the evident and definite design of producing this form"; that is, the chipping to which reference is made early in this paper as "secondary chipping." Professor Hughes, leads us to this conclusion, that if there be no secondary chipping we have no evidence of an implement; but that if there be secondary chipping, we have an implement. The specimens before us are without secondary chipping. Dr. Evans says of the Broom Pit implements, "In form they closely resemble the ordinary types from the valley of the Somme." But if the types from the Somme Valley are not more like implements than these, they will not carry conviction to my mind. Their being fractured does not prove the presence of man. I have two fractured flints, which I brought from the Somme Valley. Of these Professor Hughes says, "With regard to the shattered flints, all flints of this kind are shattered by surface action,—the action of changes of temperature due to frost and sun." If frost and sun shattered these, may not frost and sun have shattered some of those on the table before us? Then, if you are to take the outward form, I have a flint, accepted as an implement by Mr. John Evans, and also one of precisely the same form, not yet removed from its matrix, and which cannot, therefore, be of human workmanship. If, then, the form does not determine it, and the fractures do not determine it (for we are told that ice, frost, and sun will account for these), we must be careful how we arrive at the conclusion that this, that, or the other is really a human implement. I should like to ask Dr. Colan whether the workmanship of the implements of the Esquimaux was not much more like human workmanship than that in those we see before us,—whether the flint arrow-heads of the Esquimaux had not a tang or some mode of attachment to the shaft, by which one could recognise them as of human workmanship more readily than one can those on the table?

Dr. Colan.—I would mention that the implements I have in my possession are very small. They are merely the heads of arrows, such as toxopholites use, and are of the ordinary arrow shape; they could be fastened on to a shaft. Another stone implement, about the size of two or three bodkins put together, appears to be a needle or bodkin which carried "dried gut" as thread, in the stitching of seal skins, and other articles. The arrow-heads are very small in comparison with any of those flints now on the table, and very much more like the work of man.

Mr. Callard.—It is my conviction that any implement which is an unquestionable implement, such as that used by the Esquimaux, can be recognised at once, and there can be no doubt about it; but, when I look at the flints on the table, there is a considerable amount of doubt in my mind as to accepting themas human implements without any collateral evidence whatever, but simply on account of their forms. If we ask why we should accept certain forms as of human origin, we are told they are like the stone implements used by other and barbarous nations, some of whom continue to use them at the present time. But, when I see these implements of other nations, I find that they are not like the flints before us, and consequently, to my mind, the evidence fails there. Of the accepted drift implements, Professor Hughes says:—"We refer them to a certain date by their known association." I presume he meant by that their association with certain extinct mammals. I have brought a portion of a bone of one of these extinct mammals, which I took out of the gravel along with certain of these so-called implements. It would appear that in the Broom pit, from which these specimens were taken up to two years ago no bones whatever were found. Therefore, if the association with similar remains is one point of the argument, that point does not hold here. I should say of the fractured flints before me,—none of them evidence the work of human hands.

Mr. W. Griffith.—Notwithstanding the pleadings of the lecturer, I feel inclined to follow the example of Lord Eldon, and to doubt. The paper before us has been prepared with great care, and I think the arguments used are arguments of great plausibility. It is not many weeks since, in this very room, the opposite opinion was advocated, and, therefore, when we hear doctors disagreeing, we may well feel a little difficulty ourselves as to the conclusions we ought to adopt. But it appears to me that the question involved may be regarded in this way: the stones before us may or may not display human handiwork, but that is altogether apart from or preliminary to the theory sought to be established, as to the connexion of the stone implements with the earliest history of mankind. A most interesting conclusion was drawn from these implements a few weeks since, namely, that man was not of the same species as the ordinary brute creation, because these implements showed him to have been possessed of reason and social qualities which distinguished him altogether from the lower animals. I think, therefore, that, if we could satisfy our minds that these implements were of the early date which some assign to them, we should be establishing a very interesting fact in connexion with the human race,—one tending to show that the doctrine of development is not so surely founded in fact as some people imagine. This being so, it seems to come to this: what is the evidence for the two sides of the question? I do not altogether agree with the writer of the present paper in the view he has put forth with regard to the glacial period. He speaks of it as a period long since passed away; as a pre-historic period, before the appearance of man. But what does the present time give us? A glacial period still exists in the northern regions, which are constantly under the action of frost and covered with snow and ice; and glaciers are still working out the same process they are supposed to have worked centuries ago in the earlier periods of the earth's history. I think that, when we talk of the glacial period as something that has passed away, we are going somewhat beyond the fact, because it exists at the present moment to a certain extent. The remarks made by Dr. Colan, who has travelled so far in those northern regions, certainly seem very pertinent to the question before us. He has told us that in that part of the earth where the glacial period still exists, the Esquimaux are forced by the wants of nature to make implements of stone; that, being unable to obtain bronze, or iron, or wood, they, therefore, fashion the flints into such forms as are useful for the purposes of their daily life. It is a reasonable analogy that in the glacial periods of former times, if men were then in existence, the same process would take place. The answer given is this: many stones that have been found in the Valley of the Axe are not really stone implements, but have been formed by nature in such a way that some persons choose to call them stone implements; therefore, we are to reject all the evidence produced by geologists and scientific men, and to say that stone implements were not used in times past. It seems to me that the evidence for this is too weak. The British Museum authorities have made an extensive collection of these implements, and the authorities at the Exeter Museum have also an extensive collection. There is likewise a collection in the Blackmore Museum, and at Rouen I was struck with the collection I saw in the Museum there; so that we have not only those of our own nation, but the scientific men of France also,—men of practical experience,—besides naval officers who have travelled in the northern regions, testifying to the fact that stone implements have been in use from time immemorial, and are still in use in the glacial regions. Well, then, it is said that the other evidence as to man's existence in pre-historic times,—at so remote a period,—is almost conclusive in an opposite direction; that that evidence adduced in favour of a very great antiquity fails. Whether this be so or not, I do not think much affects the question. We have scientific men saying that stones have been used as implements in times past, and that they are still so used by men who have to make the implements themselves. It is possible that a stone may be naturally split into particular forms; but it is very difficult to conceive that a number of angles of a given shape will be caused in a stone so split. If we take a piece of flint we find that it will split angularly; and, if we find a great number of angles shaped into a specified form and not rounded off as in other flints by the constant friction of rolling over and over among other stones, it is probable that the angles made on that flint are of human origin. If we look at the evidence presented to us, it is, I think, in favour of the supposition that stone implements have been in use from time immemorial; and this, certainly, is an interesting fact, because it shows that the earliest man did possess intelligence.

Sir Joseph Fayrer, K.C.S.I., M.D., F.R.S., &c.—I have no intention of discussing this subject, as I do not understand it sufficiently well to do so, but rise merely to ask a question. It is said that some of the pieces of chert now on the table are in their present form the productions of nature. Would the reader of the paper be kind enough to say whether there is any recent instance on record of pieces of chert or flint being chipped and formed into the axe-like shape assumed by many of the stones lying on the table? The last speaker has alluded to the impossibility of nature producing a number of angles and points in a given form. I do not know whether this is so or not, but I believe that many of these stones are wont to divide with conchoidal fracture or cleavage, and I can understand that many of the flakes we see might be thus produced; but it is, I confess, difficult to understand how the pieces of stone now on the table were thus formed into a shape which is so exactly like that which some of the recognised and authenticated implements of man have assumed. If the author will give us some notion of what forces of nature produce this peculiar form in the stones before us—whether it has been the frost and the sun in alternations of heat and cold; surface action; or whether vertical or lateral pressure; he will remove a difficulty I have never yet been able quite to overcome. With reference to the Stone age continuing to the present time, I may say that the fact which has been stated is not peculiar to the Esquimaux, and that, if you were to look into the condition of some of the tribes of Australia, you would find almost the same thing at the present day. Whether they use stone or split flint I do not know, but some of them are so savage and barbarous as not even to know the uses of iron or bronze, and not even to have invented the use of the bow and arrow. I shall be glad if the reader of the paper will give some information in reply to the question I have asked.

Capt. F. PETRIE.—Sir Joseph Fayrer has alluded to the fact that the natives of Australia, not knowing the uses of iron or bronze, adopt stone implements. I can state it as a fact that until recently the natives of the neighbouring Pacific Islands did so. When at Sydney, twenty years ago, I remember that the men-of-war coming from the Pacific used to bring many of these stone implements, which had been obtained from the natives at some of the islands; now, however, with the spread of European civilisation we cannot get any more implements from them: their "iron age" has set in!

Mr. H. MICHELL WHITLEY.—With reference to the human bone from the Victoria Cavern, referred to near the end of the paper, a letter has been published by Professor Boyd Dawkins in *Nature* of the 24th of March, 1880, and in it the Professor says:—

> "I must adhere to my decision not to play the part of Secutor any further to a glacial Retiarius in the arena of *Nature*. If his net be strong enough to carry the upper Pleiocene and the Pleistocene mammalia of Europe, as well Palæolithic man and the Neolithic skull of Olmo, I wish him joy of them. If, further, he will kindly give me the proof that the mammalia of Auvergne, considered upper Pleiocene by Falconer, Gaudry, Gervais, and other leading palæontologists, are, as he terms them, 'a hash-up,' they shall be properly served and *iced*, if necessary, in my second edition.
>
> "I feel, however, that it is only right for me to notice the new gladiator who springs to the aid of his friend. The antiquity of man in the Victoria Cave is solely due, as it appears to me, to the *perfervidum ingenium* (I speak in all respect) of Mr. Tiddeman. It was first based on a fragment of fibula which ultimately turned out to belong to a bear. Then it was shifted to the cuts on two small bones, which were exhibited and discussed at the British Association, at the Anthropological Institute, and at the Geological Society of London. The bones are recent, and belong to sheep or goat, two domestic animals introduced into Britain in the Neolithic age. The cuts have been probably made by a metallic edge. Numerous bones of the same animals, in the same condition, and hacked in the same way, occurred in the Romano-British refuse-heap on the top of the clay, and frequently slipped down over the working

face to the bottom of the cutting before I resigned the charge of the exploration to Mr. Tiddeman after nearly four years' work. There were frequent slips afterwards. Under these circumstances the reader can decide whether it is more probable that the mutton-bones in question did slip down from a higher level, to be picked out at the bottom, or that there is evidence of 'interglacial (J. Geikie), or 'preglacial' (Tiddeman) man possessed of domestic animals, and probably using edged tools of metal. The mutton-bones seem to me to prove so much on the latter hypothesis, that they may be thrown aside without further thought.

"The reindeer (bones of feet) was found in 1872, along with fox, rhinoceros, elephant, hyæna, and bison, in the cave, at the lower horizon, which afterwards was proved to contain the hippopotamus. It was omitted in Mr. Tiddeman's lists up to 1876, when I called his attention to the fact. Then he wrote that the fact that it was so found was 'noteworthy,' and that 'these remarks [his generalisations] were made solely on the evidence which passed through your present reporter's hands since he undertook to conduct the exploration of the cavern' (Brit. Ass. Rep. 1876, p. 118). Surely it is too late, in his letter to *Nature* (March 10, 1881), to recall this on the grounds that these remains were discovered in a shaft, that my exploration was not carried on so accurately as his own, and further, that because he did not find the reindeer in the lower strata I did not. It is not for me to compare my own experience in cave-hunting with his, or to point out the value of negative evidence. The exploration while under my charge was *not* carried on by shafts only. When the hyæna-layer was reached, it was followed in the deep cutting visited by the British Association in 1873. The presence of reindeer in the hyæna-layer renders Mr. Tiddeman's views untenable which are based on its assumed absence. Most of these points have been so fully argued out before the above-mentioned societies that I am sorry to be obliged to repeat them in this letter. W. BOYD DAWKINS.

"*Owens College, March* 11."

Sir JOSEPH FAYRER.—As to the supposed human bone from the Victoria Cavern, I think it was only provisionally said, but not positively asserted, to have been human. It was a portion of a fibula, which turned out to be part of the fibula of a bear. No doubt it bore great resemblance to the human fibula. The anatomist who gave an opinion upon it, though not an absolute one, was Professor Busk.* No more trustworthy and scientific anatomist lives than Professor Busk, and I am not aware that he ever gave it as his certain and positive opinion that the bone was human. Professor Busk afterwards said that on further examination he believed the bone to be part of the fibula of a bear.

Mr. T. K. CALLARD, F.G.S.—I have seen the bone, and can well conceive that any anatomist might have made a mistake about it. It is only 6 inches in length—a piece of the middle without the articulation. Professor Busk afterwards withdrew the opinion he had ventured. Professor Boyd Dawkins in his book on "Cave Hunting" refers to it,* and suggests the animal that killed the man; while Professor Rupert Jones, also an authority, has told us the race of men to whom the bone belonged, and said it was sharp-shinned,—"platycnemic."†

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* I have a letter from Professor Busk, saying:—"After long dubitation wasted upon what at the time I regarded as tolerably good evidence, I concluded that the doubtful bone might be human, though of abnormal conformation." The bone has since been referred to by several geological writers, and it is somewhat curious, now that it has been finally pronounced by Professors Busk and Boyd Dawkins to be part of the fibula of a bear, to read the comments and theories that the first opinion gave rise to.—ED.

The Chairman.—As Mr. Whitley, the author of the paper, is not present, he will send his reply in writing; but Mr. H. M. Whitley, who has read the paper, wishes to notice one or two points in the discussion.

Mr. H. Michell Whitley.—I was asked one or two questions as to the manner in which these flints were formed. I can only speak as an engineer and a mathematician. I should be very much surprised indeed if I did not find some of the so-called implements perfectly oval. If I took an oval pebble of symmetrical form, and delivered a large number of blows of more or less intensity at equal points of delivery all round, the oval pebble would tend to form an oval implement. When these pebbles are knocked about in the glacial drift, they are somewhat in the same position.

Sir Joseph Fayrer.—How do the sharp ragged edges survive?

Mr. H. Michell Whitley.—They would retain them if only knocked about,—not rubbed about. Another point is the extreme caution that ought to be exercised in deducing the extreme antiquity of man from the data before us. I have lately been conducting some investigations in Cornwall as to the time that river silt has taken to accumulate. There are in that part of the country some very interesting deposits of silt, one about 80 feet in depth, and situated over a submarine forest, which is 80 feet below high-water mark. The trees in that forest were evidently cut down by the hand of man. Of course, 80 feet is an immense accumulation of silt, and I found, on investigation, that the accumulation of silt from alluvial deposit was going on very slowly at that spot—in Restunquit Creek, in Falmouth Harbour. It so happened, however, that I came across an old chart from which I found that, 200 years ago, that same creek had, at the spot I speak of, only 38 feet, instead of 80 feet of silt, so that, in 200 years, the accumulation had amounted to 42 feet. Several questions have been asked me which I may divide into two classes:—the first, as to facts; the second, as to my father's opinions. With regard to the facts, I may say at once that I have not visited Broom, and therefore it would be much better and fairer to my father if he were to be allowed to reply in writing to the observations that have been made by several speakers to-night. The same observation applies, of course, to his opinions.

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* He accepted it as a human bone on Professor Busk's statement, but afterwards withdrew that acceptance.—Ed.

† "The Hyænas had used the old cave as a den, and had dragged in their prey, among the remains of which is the human *fibula* above referred to. This is platycnemic in character, that is, belonged to some sharp-shinned race. * * For the age of this venerable relic we must apply to some such calculation as that used for the determination of the great uprise of Snowdon." (The period is given as about 224,000 years.)—Lecture on the "Antiquity of Man," by Professor T. R. Jones, F.R.S., 1877, p. 39.

The meeting was then adjourned.

MR. WHITLEY'S REPLY.

The remarks embodied in the discussion of my paper cover so wide a range of thought that it will be necessary for me to confine my reply to the one subject only to which it refers, viz. :—Are the so-called stone implements from the drift gravel at Broom, in the valley of the Axe, tools manufactured by man ?

Mr. Rendall appears to doubt both the authenticity and the vast number of these "tools." I can only reply that I have personally inspected the whole range of these Greensand hills, from their high escarpment which overlooks the Vale of Taunton Dean on the north, to the English Channel on the south, and that I find the angular chert gravel over the whole of the district ; but more largely developed on the flat hill-tops, and on the spurs of the lower slopes of the hills bounding the valleys, everywhere presenting similar angular forms to those of the gravel at Broom. And that in many pits over this wide range of country the supposed implements have been found and recognised as human tools, by Dr. John Evans, Mr. E. B. Tylor, Mr. Worthington Smith, Mr. D'Urban, Mr. F. Brent, and other archæologists.

Mr. Pattison confirms my description of the section of the gravel a Broom, and tells us that he has also inspected the supposed tools exhibited in the museum at Exeter, obtained from this gravel, of which he says :—" I cannot conceive any one putting forth the hypothesis that these things are of human origin ; they are merely fractured stones, like other fractured stones. But this does not upset the conclusions drawn from one or two that have had a different origin, and unless we are prepared to give up all evidence or reasoning on these matters, we are bound to accept as genuine the implements of the Palæolithic age which are claimed by the experts to be of human origin." I accept the concession that some of them are merely fractured stones, and not of human origin ; but I cannot consent to give up the results of the labours of over twenty years' examination of this subject in the field, at the bidding of a few archæological experts. And if I am not a believer in Palæolithic man, the stubbornness of the facts with which I have had to deal must bear the blame.

My friend says it is of no use my knocking down eight skittles if one is left standing. Well, I admit if one piece of fractured chert should be certainly found *in situ* deep in the undisturbed drift gravel at Broom, bearing authentic marks of human workmanship, or conclusive evidence of having been used by man, his pre-glacial existence is as fully proved as if a complete human skeleton had been found there. I have often demanded the production of such a single witness ; but it has never yet been brought into court, and if it ever should be, certainly I will not receive the evidence without a strict cross-examination. My friend may, perhaps, on the testimony of an "expert," produce one or two of his nine pins, but hitherto they have proved to be only wooden, speechless bogies. I stand firmly on my adopted, but borrowed, motto, "Time and I against any other two."

With the deductions drawn by Mr. CALLARD from his argumentative and able speech, I most entirely agree ; and in reply to his inquiry, I am enabled to say, that I have seen no *secondary chipping* indicative of human workmanship on any of the supposed implements which were shown when my paper was read, or on those in the Museum at Exeter, which I have carefully examined.

SIR JOSEPH FAYRER said,—"It is, I confess, difficult to understand how the pieces of stone now on the table were thus formed into a shape which is so exactly like that which some of the recognised and authenticated implements of man have assumed." This supposed similarity of form in stone implements of different ages was just before denied by my friend Mr. Callard; and I agree with him that it does not exist ; and this point of difference is again and again pointed out by Sir John Lubbock, who says of "Palæolithic Implements,"—"These are all of types which differ considerably from those which came subsequently into use."* "When M. Boucher de Perthes' work was published, the weapons therein described were totally unlike any familiar to archæologists."† "They ought to correspond with other stone implements of the Stone period. But this is not the case."‡

In several parts of this discussion it seems to be assumed that I am contending against the authenticity of ALL *Stone implements ; this is a mistake, and it has often been used to throw discredit on my researches and opinions. I pray, therefore, that it may be clearly understood that my contention is only against the authenticity of the supposed drift tools of the imaginary "Palæolithic" age. And that I have ever firmly held that the Stone implements of the Neolithic age are as truly the work of man as any Sheffield penknife.*

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* Intro. to Nilsson's *Stone Age*, p. 20.
† *Pre-historic*, 1st ed., p. 278.
‡ *Ibid.*, p. 279.

ORDINARY MEETING, MAY 2, 1881.

J. E. HOWARD, ESQ., F.R.S., VICE-PRESIDENT, IN THE CHAIR.

The minutes of the last meeting were read and confirmed, and the following elections were announced :—

LIFE MEMBER :—Rev. T. Ladds, M.A., Leighton.

MEMBERS :—Rev. J. B. Whiting, M.A., Ramsgate ; Miss A. W. Richardson, Ireland.

LIFE ASSOCIATE :—H. S. Williams, Esq., M.A., F.R.A.S., A.C., Swansea.

ASSOCIATES :—Herbert Crichton Stuart, M.A., D.L., Bute ; S. W. Ford, Esq., M.A., United States ; Rev. S. D. Peet, M.A., United States ; Rev. S. D. Stubbs, M.A., London.

Also the presentation of the following works for the library :

"Proceedings of the Royal Geographical Society."	*From the same.*
"Beneath the Surface." By Rev. E. Duke, F.G.S.	*Ditto.*

The following paper was then read by the author :—

AN EXAMINATION OF THE PHILOSOPHY OF MR. HERBERT SPENCER. By the Rev. W. D. GROUND.

THE "System of Philosophy" associated with the name of Herbert Spencer has now been nearly twenty years before the philosophical world, and it has slowly made its way until it has won a place in the first rank of such productions. Whatever we may think of it, it is not easy to withhold our intellectual homage. It is the last, and probably the greatest, attempt ever made to present a true philosophy of the Kosmos; it is imbued with the modern scientific spirit; it claims to be strictly in accord with scientific principles; it displays a breadth of generalisation and a wealth of energy such as we find only in the greatest works of all time; and it is by many believed to be one of the worthiest triumphs ever achieved by the unaided intellect of man. It is never easy to estimate justly any contemporary Work—we stand too near to it to see its true proportions,—but it seems to not a few that Mr. Spencer may fairly claim a place in the front rank of the intellect of the world. His greatness in this respect must in justice be conceded, and it must also be allowed that he displays high moral refinement. Yet, notwithstanding this, his system, considered as a system, can only be characterised as the entire negation of every moral element. There are no terms in his philosophy into which the idea of morality can be translated. That philosophy and the moral idea are mutually exclusive, like two circles which have no part of their area in common. He explains everything in the universe, including all the works of man's intellect, and all the emotions and aspirations of man's spiritual nature, simply in terms of Force, and he deliberately and resolutely excludes the idea that along the lines of that Force a spiritual element runs. He shows simply the working of Law, and he labours to create the impression that Law and Force exhaust all the elements of the problem. Now, we may allow that wherever God works, He works according to law,—a Law He has imposed,—and wherever He works, Force will be manifested. It *may* be, therefore, that much of Mr. Spencer's Philosophy is nothing but the presentation of two aspects of the true conception of the universe; and if we add the third and spiritual aspect, making Law and Force only the roads which intelligent spirit and moral energy make use of, it *may* be we thus arrive at a more complete and full-orbed conception of God's working in our world. But until this third aspect be added, Mr. Spencer's philosophy means nothing less than the complete and thorough-going destruction of every element out of which the distinctive conception of a Personal God or a personal self can be framed; morality, conscience, faith, prayer, are shown by it to be mere delusions, so far at least as their relations to God are concerned; and the whole system is a vast spiritual desert, where not a breath from heaven can blow. Undiluted by the spiritual, its atmosphere is deadly in the extreme. Hundreds, perhaps thousands, have lost all faith in God, and been rendered desolate for life, since they became acquainted with its tenets. With an intellectual elevation like a range of Alpine mountains, it fascinates the unwary, who are, in too many instances, only led to the regions where all thoughts of God die out, and there remain only negation and despair.

In seeking to examine this philosophy it will be understood that no easy task is before us. Its combination of intellectual range, scientific precision, high moral tone, mental energy, profound subtlety, and deadly though veiled antagonism to righteousness, make up a whole such as has never been seen in the world before. The systems of philosophy encountered by St. Paul were, compared with this, but as unproved assertions to the deductions of exact science, or as crumbling sand to solid granite. And whilst Mr. Spencer supplies the outworks and the fortification, that fortification is manned by the great body of scientific men. It is greatly understating the support accorded to the doctrine of Evolution, on which his system mainly rests, if we say that a distinct majority of the leading men of science in all countries of the globe give it their hearty and enthusiastic adhesion. Before it can be supplanted the opinions of the scientific world must be radically changed. If the acceptance of the doctrine of Evolution logically compels the acceptance of Mr. Spencer's philosophy then there is a bitter and awful conflict between Science and Theology looming before us, the issues whereof it is impossible to predict. Such a conflict must come independently of the question whether Evolution be true or false. True or false, it has now become the accepted scientific hypothesis, and nothing but stern and terrible warfare, carried on probably for fifty years, will drive it back from the position it has gained. It must be reckoned with whatever opinions any may hold concerning it. But let us now proceed to our examination, it being understood that we have to deal with a giant, and that if we would grapple with him effectively we must gird ourselves for earnest and manly struggle.

I. In the first place, then, let us prove that the existence and the immateriality of Mind is a cardinal doctrine of Mr. Spencer's Analytic system.

II. Let us point out vast tracts in his Synthetic system where Mind is altogether ignored, and Man is regarded as nothing more than a composition of solar force.

If these two points be satisfactorily established, then, of necessity, a complete and fatal contradiction has been made out to exist between two parts,—Analysis and Synthesis,—of what is claimed to be a logical unity, and, by consequence, the system, as a system, is hopelessly destroyed.

I. The existence and the immateriality of Mind is a cardinal doctrine of Mr. Spencer's Philosophy.

It is one of the last and most certain deliverances of his Philosophy that Mind and Matter both exist, and that between these two there is a chasm which no effort of ours enables us to cross. He exhausts the resources of language to declare that this is the one fact which transcends in absolute certainty every other fact. Somehow this seems to have escaped the notice of many who have criticised his writings, and he is commonly believed to uphold something like Materialism. Greater error, however, there can hardly be. Materialism has never before had such a powerful and uncompromising opponent, and it is hardly probable that it can ever again make head against his attacks. The doctrine of the absolute immateriality of Mind is a structural part of his philosophy, and one which is simply invaluable to those who see the spiritual aspect of things. He states the doctrine over and over again. On this point the following passages amongst others are surely conclusive :—

In "First Principles," the entire chapter on "The Data of Philosophy" is devoted to showing that the verdict of consciousness as to the existence of the self and the not-self must be accepted. He thus sums up the whole :—

"What is this datum, or rather what are these data, which philosophy cannot do without? Clearly one primordial datum is involved in the foregoing statement. Already by implication we have assumed, and must for ever continue to assume, that congruities and incongruities exist, and are cognisable by us. We cannot avoid accepting as true the verdict of consciousness that some manifestations are like one another, and some are unlike one another."*

On the next page, he says :—

"Consequently the assumption that a congruity or an incongruity exists when consciousness testifies to it, is an inevitable assumption. It is useless to say, as Sir W. Hamilton does, that consciousness is to be deemed trustworthy until proved mendacious. It cannot be proved mendacious in this, its fundamental act; since, as we see, proof involves a complete acceptance of this primordial act. Nay, more, the very thing supposed to be proved cannot be expressed without recognising this primordial act as valid; since unless we accept the verdict of consciousness that they differ, mendacity and trustworthiness become identical. Process and product of reasoning both disappear in the absence of this assumption."†

Thus we see he asserts that the *process* asserted as valid by consciousness must be accepted. He next proceeds to show that the *product* given by consciousness must also be accepted.

He analyses all that is given by consciousness, and divides it into two great classes. He then says :—

"What is the division" [into these classes] "equivalent to?

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* *First Principles*, second edition (from which all quotations in this paper are made), p. 140.

† *Ibid.*, p. 141.

Obviously it corresponds to the division between *object* and *subject*. This profoundest of distinctions among the manifestations of the Unknowable" [by "Unknowable" he means "Matter and Mind"] "we recognise by grouping them into self and not-self."*

A few lines further on he continues:—

"The persistent consciousness of likeness or difference is one which, by its very persistence, makes itself accepted; and one which transcends scepticism, since without it even doubt becomes impossible. And the primordial division of self from not-self is a cumulative result of persistent consciousnesses of likenesses and differences among manifestations."†

He closes the chapter by saying:—

"So much, then, for the data of philosophy. In common with religion, philosophy assumes the primordial *implication* of consciousness, which, as we saw in the last part, has the deepest of all foundations. It assumes the validity of a certain primordial *process* of consciousness, without which inference is impossible, and without which there cannot even be either affirmation or denial. And it assumes the validity of a certain primordial *product* of consciousness, which, though it originates in an earlier process, is also, in one sense, a product of this process, since by this process it is tested and stamped as genuine."‡

The chapter is again summed up in the "Principles of Psychology" in these words:—

"In the second part of 'First Principles,' when dealing with the Data of Philosophy, it was shown that the co-existence of subject and object is a deliverance of consciousness which, taking precedence of all analytic examination, but subsequently verified by analytic examination, is a truth transcending all others in certainty."§

Statements of similar import, some of which are quoted on the next page, occur at intervals throughout the Philosophy. What has now been adduced must surely prove that Mr. Spencer asserts, as clearly as words can assert, the absolute validity of the simple deliverances of consciousness, as regards the co-existence of subject and object. It might still, however, be contended that he regards both subject and object, Mind and Matter, as only fleeting phenomena, with no distinct reality underlying them as their substratum; but against such a notion the following passage seems to me conclusive.

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* *First Principles*, p. 154. † *Ibid.*, p. 154. ‡ *Ibid.*, p. 157.

§ *Principles of Psychology*, second edition (from which all quotations are made), vol. i. p. 209.

He has arrived at the point where he sums up the general results arrived at by the whole Science of Psychology, and he supposes an objector to say, "Thus, then, we are brought face to face with unmistakable Materialism." This objection he repels with all his power of plain, straightforward statement, and solid argument. He fairly ridicules the idea that Mind can be explained by material forces; he says as plainly that it is not reducible into Motion; and, after some further argument, the object of which is to show that Mind and Matter are very far apart, he thus states the final result we reach concerning them:—

"See, then, our predicament. We can think of Matter only in terms of Mind. We can think of Mind only in terms of Matter. When we have pushed our explorations of the first to the uttermost limit we are referred to the second for a final answer; and when we have got the final answer of the second we are referred back to the first for an interpretation of it. We find the value of x in terms of y; then we find the value of y in terms of x, and so on we may continue for ever without coming nearer to a solution. The antithesis of subject and object, never to be transcended while consciousness lasts, renders impossible all knowledge of that ultimate reality in which subject and object are united."*

It seems to me that no honest interpretation can be given to this passage unless we hold it to state that Mind and Matter are both real existences,—are as far as the poles asunder, the link uniting them being unrepresentable in thought,—are all that we know of two unknown things represented by factors like x and y, neither of which can be expressed in terms of the other.

The following passages are still more conclusive on the point:—"Though accumulated observations and experiments have led us by a very indirect series of inferences to the belief that mind and nervous action are the subjective and objective faces of the same thing, we remain utterly incapable of seeing, and even of imagining, how the two are related. Mind still continues to us a something without any kinship to other things; and from the Science which discovers by introspection the laws of this something, there is no passage by transitional steps to the Sciences which discover the laws of those other things."†

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* *Principles of Psychology*, vol. i. p. 627. † *Ibid.*, p. 140.

A few pages later he says:—"Can we, then, think of the subjective and objective activities as the same? Can the oscillation of a molecule be represented in consciousness side by side with a nervous shock, and the two be recognised as one? No effort enables us to assimilate them."*

Since Mr. Spencer represents a large class of thinkers, it may be well to show, in passing, that, in thus asserting the existence and the immateriality of Mind, Professors Tyndall and Huxley are in complete accord with him. However often any of these gentlemen may forget the fact, they are compelled to allow, when forced to reflect, that the physical realm is of a different order altogether from the mental realm, and, probably, their acts of forgetfulness spring from an inability to break for a time the chains of rigorous materiality in which their whole lives are spent. In simple words, they find it hard, as every Christian finds it, "to live by faith." They know that there is in man an immaterial spirit for which his organisation can never account, but they are not able at all times to realise the truth. In their brighter and nobler moments, as Professor Tyndall confessed in the Free Trade Hall, Manchester, the mist clears away, and they see clearly man's spiritual nature. At other times they sink down to a lower level, and then they speak as if we were only creatures of clay. From what, then, do these alternations come? They come from this. When they are only scientists, and not men of science,—when they are but logical, generalising instruments, employed only in the realm of the material,—they are, at such a time, living in their own narrower world, and they speak as if that world were all that exists. But when they live out their lives as full-orbed men, and regard their scientific powers, as they are, as only one tract of their nature, then the vast reality of their spiritual being forces itself into prominence, and they see and feel that, although man's body rests upon the earth, and is of the earth, he yet has kinship to the spirit Creator who gave that earth its shape. Let us, then, pardon their *lapsus,* and try to make them logical and permanent believers, by seeking to rival them in scientific precision, whilst at the same time all our Science is nothing but a large framework in which a nobler conception of the spiritual is set.

But that such is their honest faith the following passages evidence.

Professor Tyndall says, in the celebrated Belfast address:—

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* *Principles of Psychology,* vol. i. p. 158.

"We can trace the development of a nervous system, and correlate with it the parallel phenomena of sensation and thought. We see, with undoubting certainty, that they go hand in hand. But we try to soar in a vacuum the moment we seek to comprehend the connexion between them. An Archimedean fulcrum is here required, which the human mind cannot command." A few lines later he says:—"Man the *object* is separated by an impassable gulf from man the *subject*. There is no motor energy in intellect to carry it without logical rupture from the one to the other."*

In his address to the Physical and Mathematical Section of the British Association, 1868, he says:—

"The passage from the physics of the brain to the corresponding facts of consciousness is unthinkable."

Similar passages occur in the address given by the Professor to the Midland Institute, Birmingham, which it can hardly be necessary to quote.

Professor Huxley has stated the same thing in other words. Thus, in "Lay Sermons" he says:—

"The man of science, who, forgetting the limits of philosophical inquiry, slides from these formulæ and symbols into what is commonly understood by *Materialism*, seems to me to place himself on a level with the mathematician who should mistake the *x*'s and *y*'s with which he works his problems for real entities, and with this further disadvantage as compared with the mathematician, that the blunders of the latter are of no practical consequence, while the errors of systematic materialism may paralyse the energies and destroy the beauty of a life."†

It seems to me that our first point is now clearly established. The existence and the immateriality of Mind has been proved to be a cardinal and structural doctrine of Mr. Spencer's system. Professors Tyndall and Huxley have been shown to concur. The entire school of thought represented by these men may therefore be justly held as allowing that the existence of Mind, which can be accounted for by no physical facts, is one of the things which cannot be dislodged from any complete conception of the universe.

II. We have now to establish a complete contradiction to what has been already proved, by demonstrating that vast tracts of Mr. Spencer's Synthetic system ignore altogether the existence of Mind, and regard Man as nothing more than a composition of solar force.

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* Address, Sixth Thousand, p. 59.

† *Lay Sermons.*

As preliminary to this task, let it be distinctly understood that our clear understanding of the mode in which any fact came into consciousness by no means robs that fact of its validity and its authority. If only it *be* a fact of consciousness,—a primary deliverance of consciousness,—we are compelled to take it on its own credentials, and we have no right to go behind it, and inquire by what authority it presumes to dictate to us. If it be a king *de facto* it must be obeyed, and any reference to its antecedents with the view of showing its unfitness to rule is quite inadmissible. We may prove it to be of plebeian origin, but if it has become a structural element of our mental being we have no choice but to permit its domination over us. Mr. Spencer most distinctly allows, and most vigorously contends for the truth of this proposition, with regard to the Logical Laws. If his Philosophy has proved anything it has certainly proved this,—that those Laws of thought, —those Logical Laws which determine how all our reasoning shall be carried on, are not, as they seem to be, primary and original creations in us, but are rather the slow elaborations and co-ordinations of much humbler elements of Mind, which elaborations have been carried on through unnumbered organisms, have steadily acquired stability, range, precision; have been handed down in ever-increasing complexity from one generation to another, until they have at length taken their places as elements not to be dislodged from our mental structure. No part of his system is more satisfactory than his proof of this proposition, though, as it extends over the whole of 920 pages,* it is impossible to show its full force in the present paper. Nevertheless, although the genesis of those Laws is, as Mr. Spencer holds, most conclusively proved, yet he shows, in reasoning of remarkable beauty and power,† that our knowledge of their origin militates nothing whatever against their authority over us, inasmuch as we can never learn anything as to the way by which they came to that authority, without assuming their validity over and over again. The very reasoning by which we demonstrate their untrustworthiness has, as its necessary foundation, the assumption that they are trustworthy. Mr. Spencer, therefore, as a wise man, rejects the conclusion arrived at by a long process of reasoning, in favour of that simple and straightforward verdict which is given by consciousness. He proclaims as distinctly as Sir William Hamilton that consciousness is an impregnable rock, on which any true philosophy must found: he asserts that the deliverances of consciousness must be accepted, no matter what evidence there may be to the contrary.

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* *Principles of Psychology*, vols. i. and ii., up to end of "Special Analysis," p. 297.

† "General Analysis," in vol. ii. of *Principles of Psychology*, pp. 305-489.

Having, then, Mind given us as one of the factors of man's nature, we are entitled to go to mental philosophers and ask them what they find in Mind. We have a clear and undoubted right to bring in their analysis, and to learn from them what regions together make up the entire territory of consciousness. In this matter we cannot accept Mr. Spencer's dictum. His authority as a pure mental philosopher is of little weight. In this realm there are far greater names than his, and to these we must defer. He tells us, from his examination of the universe, that Mind exists. We now, then, call in the specialist, the mental philosopher, and ask him what it is that Mind contains.

There are three primary deliverances which mental philosophy declares to be facts of consciousness. These are:—1. Our sense of Personality and of Identity,—the consciousness that we are personal individual units, and that we are the same beings as we were awhile ago. 2. Our sense of a Law of Moral Obligation, informing us of the existence of a code laid down to guide our conduct, requiring our obedience to that code, and hinting, more or less clearly, at certain vague yet terrible penalties which disobedience will certainly bring upon us. 3. Our sense of Moral Liberty, which tells us that whatever motives may be brought to bear upon us, and whatever precepts or hints may be given to guide us, we yet stand perfectly free to accept or reject such guidance, and are compelled to be supreme arbiters of our own destiny, choosers of our own shape and character, fashioners of that self which shall endure as long as consciousness lasts.

That these three are facts of consciousness is not allowed by all philosophers; probably, however, in number and weight their assertors greatly predominate. Plato, Kant, and Hamilton may be cited as giving them clear and glowing expression; Moses, St. Paul, and St. John certainly hold the first two, as, in a sense which is amply sufficient for us, they as certainly hold the last.

We thus obtain three great propositions, to the truth of which we have a witness of the most absolute validity. With each of these three propositions Mr. Spencer's system of philosophy comes into complete and thorough-going antagonism. He claims to have established the logical contradictory in each case. That is to say, he claims to have proved three propositions which are utterly contradicted by what certainly seem to be plain facts of consciousness. He claims to have shown that our consciousness of Personality is a delusion, and that we are really nothing more than a bundle of fibres, modifications of solar force. He claims to have shown that what we call Conscience is the mere upgrowth of our mental and emotional nature evolved in us by the play of social forces. He claims to have shown that we have no real Liberty, that we are only aggregates of protoplasm, registering in our organisms all the forces that play upon us, and combining these according to unvarying law.

I now proceed to deal with the first of these.

1. *Our Sense of Personality and Identity.*

If consciousness tells us any one thing, it surely assures us that we are persons; it declares the existence of a self; it says that our whole organisation in all its parts is unified, so that one *ego* inhabits and ranges over its entire territory. As stated above, Mr. Spencer claims to prove that we are only bundles of nerve and other matter; afferent and efferent threads of nerve fibre, with uniting ganglia; a huge concourse of atoms, not fortuitous, but bound together under strict and unvarying laws. He maintains that connexions and co-ordinations have been gradually established in this organism; that the deepest and greatest of such connexions have become structural in us by long-continued descent, so that they make the broad channels along which our nervous energy must go, in much the same way as Geology declares the course of a great river has been slowly but surely determined by the volume of water scooping out the river-bed. Hence they appear in us, he contends, in the shape of the Logical Laws, structurally embedded in our mental being. He says:—"The universal law that, other things equal, the cohesion of psychical states is proportionate to the frequency with which they have followed one another in experience, supplies an explanation of the so-called 'forms of thought,' as soon as it is supplemented by the law that habitual psychical successions entail some hereditary tendency to such successions, which, under persistent conditions, will become cumulative in generation after generation. We saw that the establishment of those compound reflex actions called instincts is comprehensible on the principle that inner relations are, by perpetual repetition, organised into correspondence with outer relations. We have now to observe that the establishment of those consolidated, those indissoluble, those instinctive mental relations constituting our ideas of Space and Time, is comprehensible on the same principle." He then shows that Space and Time being the invariable attributes of the non-ego, will produce a similar invariability in the ego, and he continues:—"As the substrata of all other relations in the *non-ego*, they" (Space and Time) "must be responded to by conceptions that are the substrata of all other relations in the *ego*. Being the constant and infinitely-repeated elements of thought, they must become the automatic elements of thought—the elements of thought which it is impossible to get rid of—the 'forms of intuition.'"* In a similar way, he contends, all our powers of emotion, aspiration, affection, faith, have grown up, and, in this fashion, the cultivated European of to-day has been evolved out of the most rudimentary forms of life. This doctrine cannot readily be stated in Mr. Spencer's own words, it is a crystallisation of the reasoning in an argument which stretches over 4,000 pages.

The following passage covers some of the ground:—"The corollary here drawn from the general argument is, that the human brain is an organised register of infinitely numerous experiences received during the evolution of life, or, rather, during the evolution of that series of organisms through which the human organism has been reached. The effects of the most uniform and frequent of these experiences have been successively bequeathed, principal and interest; and have slowly amounted to that high intelligence which lies latent in the brain of the infant—which the infant in after-life exercises and perhaps strengthens or further complicates—and which, with minute additions, it bequeaths to future generations. And thus it happens that the European inherits from twenty to thirty cubic inches more brain than the Papuan. Thus it happens that faculties, as of music, which scarcely exist in some inferior human races, become congenital in superior ones. Thus it happens that out of savages unable to count up to the number of their fingers, and speaking a language containing only nouns and verbs, arise at length our Newtons and Shakspeares."†

Now, against all this we are surely entitled to oppose the simple statement of that consciousness which Mr. Spencer himself has admitted is the final court of appeal, and to say to him in reply, "No matter however clearly you may account for our nervous structure,—if you could show us a map of ourselves, wherein all our powers were traced back to molluscs, as distinctly as the Great Western Railway can be mapped from London to Bristol,—if also you could prove, with the certainty of a demonstration of Euclid, that the stream of Force which made us was compelled at every turning-point to go along that way, and could go along no other way,—we are still entitled to turn round to you, and say, ‘I do not care much where my nerves came from; I only know that, having got them, they are mine. There is a something which I call Self, which flashes like a spirit from one end of my organism to the other, and claims the whole as its own; and if you tell me that I am only a bundle of afferent and efferent nerves, then, as a plain man, loving truth, I fling over with scorn all your strange phraseology, and I oppose to it the straightforward verdict of my simple common sense. By your own confession, common sense is the means by which you arrive at this wonderful idea that I am a mere automaton; you admit that the oftener you use that common sense in reasoning the greater is the probability of error; you admit that your conclusion is one in which that common sense has been used thousands of times. I prefer, then, to go to the same common sense only once, and to accept that dictum which she clearly enunciates. That ‘the whole is greater than its part’ is at least as certain as that ‘circles are to one another as the squares of their diameters,’ even if the latter be fairly demonstrable from the former, and that I am a personal self is at least as certain as that I am only a bundle of variously modified fibres. This last statement is contradicted by the first. I prefer, therefore, to take that way which lies just before my own door, and not go far round about only to be landed in a philosophical quagmire.”

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* *Principles of Psychology*, vol. i. pp. 466–7.

† *Ibid.*, pp. 470-1.

Taking this as the reply of a plain common-sense man, I conceive it is valid, and that Mr. Spencer has no means of rebutting it save by denying the validity of that consciousness to which he himself appeals. If it be valid, obviously a complete contradiction is established between his doctrine on this matter of our personality, and his doctrine as to the absolute certainty of the statements of consciousness.

It is, however, clear that if one part of Mr. Spencer’s philosophy contradicts another part, it cannot be a logical unity, and careful search can hardly fail to detect a gap in the reasoning. Such a gap occurs just where it might have been expected, when Mr. Spencer attempts to pass from the conception of a composition of solar forces to our organism as at present constituted. At this point, if I am able to understand his arguments, he does nothing but assume the very point at issue. His reasoning is not easy to follow, but, when he is comprehended, I think it cannot be denied that his argument is altogether at fault. I would call special attention to this, for it is one of the chief points in this paper. If I am right, his System is broken into two, and that means that, as a Philosophy, it is destroyed. In "First Principles," in the chapter on the "Transformation and Equivalence of Forces," he has been showing that all the changes in the physical universe came from the solar rays. That is to say, he proves the doctrine of the "Correlation of the Physical Forces." He then proceeds to show that from the same force come all the organic, vital, and mental changes. He allows that his reasoning is hardly conclusive, and he therefore attempts to prove that his doctrine is a necessary corollary from the "Persistence of Force," which, as he has proved, is a datum of consciousness. The following are his words :—

"Each manifestation of force can be interpreted only as the effect of some antecedent force; no matter whether it be an inorganic action, an animal movement, a thought, or a feeling. Either this must be conceded, or else it must be asserted that our successive states of consciousness are self-created. Either mental energies as well as bodily ones are quantitatively correlated to certain energies expended in their production, and to certain other energies which they initiate; or else nothing must become something, and something must become nothing. The alternatives are, to deny the persistence of force, or to admit that every physical and psychical change is generated by certain antecedent forces, and that from given amounts of such forces neither more nor less of such physical and psychical changes can result. And since the persistence of force, being a datum of consciousness, cannot be denied, its unavoidable corollary must be accepted."*

I have expended some hours of thought upon this passage, in order to make sure of not unjustly accusing a thinker like Mr. Spencer of faulty reasoning; but each examination only makes me more certain that, for once at least, he is altogether illogical. Let us look at what he says, sentence by sentence. "Each manifestation of force can be interpreted only as the effect of some antecedent force, no matter whether it be an inorganic action, an animal movement, a thought, or a feeling." All this we may concede, adding only this proviso, that as every antecedent force which generates an action must operate in the same region as that action, must be *in eâdem materiâ*, and as Mr. Spencer has assured us that the antecedent solar ray is at the opposite pole of being from the mental energy it is said to originate, we are curious to learn how this chasm is going to be bridged over. The magician is going to pass from the extended beam of light (for, to the scientific imagination, the Matter or Ether of which light is the undulation has surface and weight as manifestly as a cannon-ball—an *undulation* is unthinkable save as existing in a *material* substance), he is going to travel logically from this extended beam of light to the unextended Mind; and we wonder by what road. He continues: "Either this must be conceded, or else it must be asserted that our successive states of consciousness are self-created." This may pass without remark. But he goes on,—"Either mental energies as well as bodily ones are quantitatively correlated to certain energies expended in their production, and to certain other energies which they initiate, or else nothing must become something, and something must become nothing." Now, see the sophism in this sentence. Undoubtedly "mental energies" are "quantitatively correlated to certain energies expended in their production," but the energies which alone can generate mental energies must themselves be *mental,* for Matter can never build up Mind. No x, multiplied by any conceivable factor, can make y. Where organic life is already existing, solar rays may so act upon it as to give it power to assimilate inorganic Matter, and so build up the Matter of which its nerve tissue is composed; but the Mind, which dwells in that nerve tissue, can only be produced by something that can build up Mind. This, solar rays are powerless to do. By the "certain energies" which are expended in the production of Mind, Mr. Spencer means physical energies—the energies of the sun—and his argument is pure nonsense if he does not mean these; but, when we supply this, the sophism appears at once. "Either mental energies as well as bodily ones are quantitatively correlated to certain [physical] energies expended in their production,"—here we see the absurdity in a moment,—"mental energies quantitatively correlated to physical energies"! when Mr. Spencer has assured us the two are in different regions of thought, separated by a barrier we can never cross! I thought "correlated" meant brought into co-relation with, and I thought "quantitatively correlated" meant that one term of the relation was the same quantity as the other term; but how the mental force required to produce "Paradise Lost" can be equal in quantity to any amount of sunlight passes my imagination to conceive.

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* *First Principles*, second edition, p. 221.

It will be observed that Mr. Spencer here goes far beyond the statement of Professor Tyndall. In the Belfast Address we were told:—"We can trace the development of a nervous system, and correlate with it the parallel phenomena of sensation and thought." To this language there can be no objection. A nervous system already implies Mind; nervous matter is a composition of two factors, objective and subjective: objective it is Matter, subjective it is Mind. Of course, therefore, sensation and thought may be correlated with it. But Mr. Spencer speaks of correlating "physical energies,"—the rays of the sun,—"with mental energies," the operations of the mind!

It can hardly be necessary to pursue the argument further. Mr. Spencer's reasoning hopelessly breaks down. Having an impossible task to accomplish, he fails to accomplish it.

Probably it will be well to show from other passages that Mr. Spencer really attempts to pass without a logical break from the inorganic to the organic. On this point the following quotation seems to me conclusive:—"The separation between Biology and Geology once seemed impassable; and to many seems so now. But every day brings new reasons for believing that the one group of phenomena has grown out of the other. Organisms are highly differentiated portions of the Matter forming the Earth's crust and its gaseous envelope; and their differentiation from the rest has arisen, like other differentiations, by degrees. The chasm between the inorganic and the organic is being filled up. On the one hand, some four or five thousand compounds once regarded as exclusively organic have now been produced artificially from inorganic Matter; and chemists do not doubt their ability so to produce the highest forms of organic Matter. On the other hand, the microscope has traced down organisms to simpler and simpler forms, until, in the *Protogenes* of Professor Haeckel, there has been reached a type distinguishable from a fragment of albumen only by its finely-granular character."*

The above statement is important, not only as showing clearly Mr. Spencer's opinion, but also as affording a good instance of the extreme looseness of statement, so alien from the true scientific spirit, which sometimes mars his pages.

Once more he says, "That Life consists in the maintenance of inner actions corresponding with outer actions, was confirmed on further observing how the degree of Life varies as the degree of correspondence. It was pointed out that, beginning with the low life of plants and of rudimentary animals, the progress to life of higher and higher kinds essentially consists in a continual improvement of the adaptation between organic processes and processes which environ the organism. We observed how along with complexity of organisation there goes an increase in the number, in the range, in the speciality, in the complexity, of the adjustments of inner relations to outer relations. And in tracing up the increase we found ourselves passing without a break from the phenomena of bodily life to the phenomena of mental life."*

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* *Principles of Psychology,* vol. i. p. 137.

These passages must make it abundantly clear that it is a cardinal and structural doctrine of Mr. Spencer's whole Philosophy that there has been no break between the first mechanical forces of Matter and the best and noblest developments of Mind. This doctrine we have now surely overthrown. It has been proved from his own statements in his own words, that "no effort enables us to assimilate" Mind and the Matter that is in close alliance with it. If, then, our reasoning be sound, his philosophy is no longer a whole, it is broken into fragments. It fails to account for the facts of the universe.

And now, having pierced his centre, we can, I think, drive him back along the whole line. His sophistical evasion of the real difficulty,—his illicit introduction of a factor he has no right to introduce, which we have marked in this instance,—perpetually characterises his reasoning; and although he cannot often be brought to book as in this case, yet at every point in his argument there is the same use of a forbidden element. He is engaged in elaborating the element of physical Force, and he is entitled to take all that Force can give him. But until *he shows how Force can become Mind*, how the extended beam of light can become the unextended, he is not entitled to one iota of mental energy. We may say to him, adapting well-known words:—

> "Take thou thy beams of light;
> But, in the taking them, if thou dost filch
> The smallest particle of Mind's proper powers,
> Thy system falls all shatter'd and o'erthrown;
> Thy serried ranks are cleft, and ne'er again
> Shall Reason own thee as her loyal son."

Now this offence Mr. Spencer commits. He steals some Mind, and he maintains underneath the surface of his reasoning an illicit channel of communication by which he can, all unperceived, take feloniously as much more Mind as his necessities may demand. His argument is curiously like the common account of the introduction of sin into our world. One sin, seemingly simple, *introduced the principle,* and that sin went on working *underneath the surface,* present in every part of the long line of all the generations of men. Or, to take another illustration. He is like one weaving a thread of varied strands, who by sleight of hand has obtained one strand to which he has no just right, and then having it, keeps working onward, ever taking more, and so produces his thread with the one strand which everybody knows has no right to be there. So Mr. Spencer, being engaged in developing solar rays, has seized this thread of Mind; he then skilfully contrives to wind solar rays and Mind together, until at length he reaches molluscs, and he still continues the process until, lo and behold! out of the first patch of star-dust we have evolved the powers of a Shakspeare! His logical sin is, therefore, one of the most dangerous and most unpardonable kind, for it is one which is ever secretly repeated, and ever on a larger scale,—he has embezzled some Mind, and he goes on purloining until he has done his best to construct a universe without an Intelligent Creator.

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* *Principles of Psychology*, vol. i. pp. 293–4.

Thus along every part of the far-extending generalisation which stretches from the humblest organic form right through the whole of animated nature, until it finds its completion in Man, and in the highest powers of the highest man, Mr. Spencer has contrived, in this illogical fashion, to put that element of Mind to which he has no conceivable right. His long line of circumvallation is manned by men whom he has stolen, one by one as he needed them, from the opposite ranks. Solar rays acting on extended and solid molecules of the Matter of which nervous fibres are made, can indirectly build up that Matter (*i.e.,* they give the Matter energy to build up itself), but they can never build up the Mind which rides upon or dwells within those molecules. If *Eozoa* are declared to be sentient, we can only attribute such sentiency to a low kind of Mind, which dwells within them, and we refuse as resolutely as ever to regard that Mind as only the synonym of a nervous change. With them, as with us, Mind rides upon the nervous changes, is correlated with those changes, but it is separated from them by the whole diameter of being. And as the line of evolution is carried on by Mr. Spencer from *Eozoa* up to higher organisms, at each step of the process, as the nervous matter is developed, he quietly *takes for granted* that Mind develops along with it. Having once crossed *per saltum* the chasm between the inorganic and the organic, he steadily continues moving on these forbidden paths until the exigencies of his argument, as we shall see, force him to a further unwarranted leap. And as he shows nervous matter developing at an ever greater ratio, and as he assumes that Mind developes at the same ratio, the result is that his original sin is growing to ever greater proportions. At first he had stolen only the mind needed for a mollusc, at last he has grown bold, and filches away all the Promethean fire needed for the creations of a Shakspeare.

Now, if this reasoning be just and honest, as it seems to me it is,—and I gladly welcome any one who can point to a flaw; we want truth, not victory,—then surely we have done nothing less than, in effect, throw down Mr. Spencer's high line of defence from one end of his fortresses to the other. For we have shown that it can be fatally pierced at any point we choose to name. Every tiny evolution of nerve matter he claims to be an evolution of Mind,—and his philosophy falls in utter ruin if it be not such an evolution of Mind. Now, we have shown it is not such an evolution; hence at every point of his mighty generalisation he can be successfully assailed, and all his defences ground into powder. We have nothing to do but to choose our points of attack. Let us select one.

The mode in which Mr. Spencer attempts to show that a rudimentary eye might be produced by the known action of light on the organism will suffice for our purpose. He has been showing that Life, as we can trace it, may be described as correspondence between an organism and its environments; he has also shown that Life becomes larger and more complex as a greater and more complex environment plays upon the organism; and he is in the midst of a chapter where he traces that correspondence as extending in Space. He has shown how all the senses might, by this means, be developed, and he comes to the sense of Sight. These are his words:—"Though that ability to distinguish light from darkness which characterises the entire body in sundry of the humblest types, foreshadows the visual faculty, nothing like what we call sight results until this ability is concentrated in a particular spot. The rudimentary eye consisting as in a *Planaria* of some pigment grains may be considered as simply a part of the surface more irritable by light than the rest. Some idea of the impression it is fitted to receive may be formed by turning our closed eyes towards the light, and passing the hand backwards and forwards before them. But as soon as even this slight specialisation of function is reached it becomes possible for the organism to respond to the motions of opaque bodies that pass near; while only a general sensitiveness to light exists, the intercepting of the sun's rays by something which throws the whole or a greater part of the creature into shade is required to produce an internal change; but when there comes to be a specially sensitive spot, anything which casts a shadow on that spot alone, produces an internal change. And as that which obscures only a small part of the organism is usually a comparatively small object, this advance from diffused sensitiveness to concentrated sensitiveness enables the organism to respond, not only to marked general changes in luminousness which its environment undergoes, but also to marked special changes in luminousness caused by the motions of adjacent bodies."*

Mr. Spencer here commences to travel from the sensation of the oyster to the perception of the eagle. This is therefore an important turning-point, being nothing less than a line of higher departure. We can see how he shows that the sensation caused *by actual contact,* which all organised bodies manifest, might, by the known action of light upon a sensitive organism, set up a higher degree of nervous activity in that part of the organism which was thus acted upon; which higher nervous activity would, in accordance with well-known physiological laws, slowly but surely produce such structural modification as would enable the organism to detect the existence of opaque bodies *not* in actual contact with it. The remarkable fish, the *Scopulus,* which inhabits the lowest depths of the Atlantic, and hence needs more light, to obtain which light it has developed three imperfect eyes on each side of the back, is perhaps a concrete example illustrating Mr. Spencer's abstract statement. It is quite certain that if our sense of touch were made fine enough it could appreciate the impact of beams of light. Professor Crookes's beautiful experiments, showing the dynamical power of light, sufficiently prove this. The transition, therefore, from sensation to perception is not intrinsically improbable. But let this be distinctly remarked. Whatever increase of Mind or of nervous sentiency we attribute to a creature thus developed, to that increase Mr. Spencer has no manner of right. He must steal every particle thereof. If the Mind in the nervous organisation of a creature able to detect only actual contact be 20, and the Mind in a creature able to detect an object not actually touching it be 25, that difference of five represents so much Mind that the exigencies of Mr. Spencer's argument compel him to purloin. As nervous matter is specialised and differentiated it needs Mind as, so to speak, its subjective lining; and as Mr. Spencer has never shown how he can honestly obtain one particle of this lining, we have no choice but to declare, since he really claims to have shown the Evolution of Mind, that he can do so only by committing logical felony on a scale, with an audacity and in a fashion so dexterous, that he must stand out as one of the most distinguished of all the sophists who have bewildered mankind.

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* *Principles of Psychology,* second edition, vol. i. p. 314.

The extent of his embezzlement may be inferred from one simple statement. It stretches over the whole realm of animated nature, from the most rudimentary organism up to and including the powers of Newton, Shakspeare, Michael Angelo, Handel, and even Moses, St. Paul, St. John.

He claims to have proved that all the great men in our world might have been developed by solar rays. We have shown that solar rays can never give him Mind: hence, as he claims to have proved the evolution and growth of all that Mind, we can only charge him with an intellectual fraud, having these gigantic proportions. Aiming to be the Colossus of philosophy, and to unify all human knowledge, this towering ambition necessarily made possible a sin of corresponding greatness. Some of the consequences of this sin we stated at the beginning in the shape of hundreds and thousands of lives bereft of all faith in God and the unseen, through this far-extending falsehood!

It seems to me, then, that our second point is now conclusively proved. We require Mr. Spencer to hand back all that Mind to which he has no manner of right, and to leave his philosophy entirely bereft thereof. He now has the *Matter* of which nervous fibre is made, but he has not the *Mind* which dwells in that fibre. Hence it is true that there are vast tracts in his system,—to wit, the whole nervous organisation of all animated nature,—where Mind, when he has restored what he has stolen, is altogether ignored. But Mind is, he has himself assured us, one of the existences, for whose reality we have most absolute proof. Here, then, is a complete and glaring contradiction between two parts of what he claims to be a logical whole. It seems to me his system is destroyed; a vast chasm is made in it, which I do not think even he can ever repair.

We may, however, allow that if only he will keep within his proper limits, very much of what he has written will stand in lines of unfading truth and beauty, and he will have the honour of lifting the human intellect to a higher plane of thought and life. He is so great and many-sided, and he has contributed such a vast amount of intellectual force, that no one who reverences the mind of man as one of the greatest handiworks of God can honestly refuse him homage. He stands before us vast in proportion, of the build of the giants, perhaps of the immortals; and his nature is not yet made up so as to show us what will be his ultimate place,—whether amidst those who shed kindly benefactions on the race, or those who, like evil angels, leave behind them a heritage of negation, unbelief, and despair. But if his system is to bear the impress of truth, its name must be changed. If he will call it the "Science of the Physical Laws," it will remain as a most valuable monument of learning and research. But it is no "System of Philosophy." It is no unification of knowledge. He must yield up that proud title. The device on the cover represents a terrible falsehood. That device is a number of crystals, upon which rests a bed of mould, out of which a flower springs; on the lower branches a caterpillar is crawling upwards towards the fully developed blossom, on whose top a butterfly rests. Its meaning can only be that highly-developed organic life grows, without a break, from the properties and forces of mere inorganic matter. If the reasoning of this paper be correct, this has now been proved to be an untrue statement. Mr. Spencer may continue to use the device he has chosen, but, in that case, he seems to me like a knight who persists in quartering the arms of some great hero, after it has been shown that he has no manner of title thereto.

In future papers I hope to show that the two other great deliverances of consciousness are similarly upheld by a sound philosophy, and that Mr. Spencer's reasoning against them is weaker and more illogical than it has been shown to be on the present occasion.

For the convenience of readers who may not be well acquainted with Mr. Spencer's Works, a short abstract of his "First Principles" is here subjoined. It is believed that this will greatly strengthen the argument of the preceding Paper by making evident that our assault has been directed against a central and all-essential part. It will be understood that no positive opinion is expressed as to the actual validity of Mr. Spencer's arguments save where objection is taken against him.

Part I. of "First Principles" is devoted to "The Unknowable." Here "Ultimate Religious Ideas" and "Ultimate Scientific Ideas" are analysed, and are each shown to contain some underlying truth, some "Unknown Reality," of which Reality, however, they can be but imperfect expressions. From this point we are made to rise to the conception that all our knowledge, and indeed all conceivable knowledge, is, not absolute, but only relative,—is really only a term to hide our ignorance,—and some of the reasoning which Hamilton put forward to establish his "Law of the Conditioned" is accepted. As, therefore, neither Science nor Religion can arrive at absolute truth, it is contended that the reconciliation between them must be made by each admitting that its explanations are only proximate, and not ultimate, and that the Universe displays, in all its phenomena, the existence of an Unknown Power, which Power must remain to us for ever inscrutable.

[In saying that the "Power" manifested in the Universe is "Unknown" and "Unknowable," Mr. Spencer seems to hint that his conception of the Supreme Being may rise as much above Personality as Intelligence and Will rise above mere mechanism. This is very startling. Mr. Spencer may have a conception of God higher than that which satisfied men like Moses and St. John, although this staggers belief; but, inasmuch as he denies to man both Conscience and Will, thus degrading man to a position lower by far than any they attributed to him, it becomes simply incredible that Mr. Spencer's conception of God can be so incomparably exalted.]

Part II. of "First Principles" is devoted to "The Knowable." Philosophy is first defined as the unification of knowledge, the gathering up into one extended logical conception of all truths contributed by each one of the Sciences. But a point of certain knowledge is needed as a Datum from whence to start, and a provisional Datum is found in the assertion of consciousness that subject and object both exist. All the objective facts which consciousness gives us are then resolved into our subjective conceptions of Space, Time, Matter, Motion, Force. These five are further resolved into one higher generalisation, viz., the "Persistence of Force." Thus the "Persistence of Force" is shown to be the only objective fact to whose existence consciousness testifies. The reasoning which proves this seems very strong. Thus the "Persistence of Force" forms a solid rock of certain truth in the midst of a fluid and changing universe. It is then shown that from this "Persistence of Force" there follows of necessity the continuance and the precision of natural law, *i.e.*, there follows what the Duke of Argyll calls "The Reign of Law" and the "Unity of Nature." The one law of our Globe, the "Correlation of the Physical Forces," is then traced in its multiplied results. Up to this point, if there be a break in the reasoning, I am unable to discover it. The "Correlation" is applied to Astronomy, Geology, vegetable growth, and then—without any break—to the growth of animals, the growth of man, to all mental changes, and all social movements. It is admitted that to include Mental Evolution in the sweep of this all-comprehending law will startle, but it is contended that there is no help for it. In order to strengthen the argument, the attempt is made to show that all this is a necessary corollary from the "Persistence of Force." It is here that Mr. Spencer's reasoning, quoted on pages 14 and 15 of the foregoing Paper, occurs. Manifestly, then, his whole argument, the continuity of his Philosophy, depends on his showing that the one Law, the "Persistence of Force,"—of the Solar Force,—can account for all the things to be found in Man, in his Mind, Will, Feelings, Conscience.

We have shown the unwarranted leap he is compelled to make in order to arrive at this result. Evidently, therefore, his system, which ought to be a unity, is here broken up into two contradictory fragments. He next shows that the motion generated by the Solar Force always follows the line of least resistance; and out of the working of this law he explains many hundreds of facts in Astronomy, Geology, Organic Growth, Mental Evolution, Political Economy. The conception of Evolution thus gained is then carried on through several chapters; and it is shown that, on this principle, many thousands of known facts in all the Sciences, in Art, in History, can be accounted for. From the working of this law it is shown that large "Homogeneous" masses would result; which, being very unstable, would have a great tendency to break up, or be evolved into the "Heterogeneous"; the results whereof would be the "Multiplication of Effects," the "Differentiation" and "Segregation" of "Individuals," and the general development of a highly individualised and specialised type. This "Individuality," it is shown, would grow, in speciality and perfectness, until its final consummation or "Equilibration" was gained, after which the process of "Dissolution" would begin. This great law, the "Instability of the Homogeneous," is thus shown to be capable of accounting for some of the greatest, deepest, most complex, and most remarkable of all the movements that have gone on in our race.

Thus, from the first patch of star-dust to the full-orbed completeness of our nineteenth century life, the system attempts to make one broad logical road!

The argument it makes for Evolution is this:—If Evolution be not true, it is passing strange that millions of facts are explained by it. A true key of the universe must fit the universe; when, therefore, a key does fit so often, the presumption is that it is the true one.

The Chairman.—It now becomes my duty to convey the expression of our thanks to Mr. Ground for what I think we must all feel to have been a very ably-reasoned and well-conducted argument, which has been successful so far as I can judge, in proving the hollowness of the system he attacks. There are, perhaps, some minor points which I might have wished to have seen somewhat differently treated. I would rather not have seen so very much admiration for Mr. Herbert Spencer combined with the reasoning of the paper; which proves so successfully that if this "writer" is indeed a "giant" in philosophy, he is but a giant stuffed with straw. I cannot, therefore, give my assent to some of the concluding remarks in the paper, especially where the writer says, "Very much of what he (Mr. Herbert Spencer) has written will stand in lines of unfading truth and beauty, and he will have the honour of lifting the human intellect to a higher plane of thought and life." I do not see what powers of the "giant" have been so much developed in the 4,000 pages of the book referred to; for if all those 4,000 pages rest on an utter fallacy, as I most fully and freely believe they do, what have we to consider but something to perplex and bewilder us, and to lead to those dreadful consequences which have been so well pointed out? Voltaire is reported to have said, "*Ce n'est pas la logique qui manque aux hommes, mais le point de départ.*" We cannot surrender our common sense, even to a giant in philosophy who has unified everything. We cannot give up to Mr. Herbert Spencer those points which are so ably and well pointed out as the fallacies on which his whole system is built. Mr. Herbert Spencer tells us about force. What does he mean by "force"? He does not know himself. I cannot learn from him, nor can the whole of the philosophy of the present day tell me what "force" is. (Hear, hear.) Still less can it explain to me in what way "force," as a term, is to be explained. For instance, the attraction of atoms in the atomic theory is as much proved as any theory can be by chemical change, and so forth; but it is utterly inexplicable by anything like what the word "force" implies.

The Hon. Secretary.—The following short letter has been received from the Rev. Canon Saumarez Smith, D.D., Principal of St. Aidan's Theological College, Birkenhead:—

"*Principal's Lodge, St. Aidan's College, Birkenhead.*
"30*th April*, 1881.

"Mr. Ground's paper seems to me a clear, able, and suggestive criticism, and one that admirably points out how, admire as we may the mental energy and grasp of Mr. Herbert Spencer, we cannot regard his ambitious argument as really *philosophical.* He does not accept, simply and sincerely, 'the deliverance of consciousness,' and so becomes, whether he would wish to be regarded so or not, onesided and illogical."

Professor O'Dell.—I have studied mind under many phases, both sane and insane, civilized and uncivilized; I have also studied Mr. Herbert Spencer's works to a great extent. There is one thing that strikes me as being very feebly developed in the mental conformation of Mr. Herbert Spencer, when we compare his mind with the minds of most other men; and that is, that he must be short of that faculty which we all possess, and which we define as the faculty of spirituality—the belief in the spiritual. Go where you will, and I myself have been in many places among the civilized and uncivilized, and have never yet come across a man who did not believe in a spiritual existence. Some people will say, it is the priest who has taught this, but this belief is held where the foot of priest has never been, and I have found uncivilized beings bowing down to a stone god, and believing in a spiritual existence. I say that there is in every mind a natural belief in the spiritual, just as there is in most minds a knowledge of colour—that is, variety of colour. But if one man, with a marvellous intellectual power and perfect mode of expression, stands up and tells us we are all wrong, and that there is no such thing as colour, are we to accept his theory, simply on account of his power of mind and the beauty of his diction? By no means. And so it is, or ought to be, with Mr. Herbert Spencer and Professor Huxley and Mr. Darwin. If they tell us that there is no such thing as the spiritual, they tell us so in contradiction to our own observation; and I am one of those who believe very much in common sense, though common sense seems to be ignored by those philosophers who are opposed to the immortality of man, and the doctrines of Christianity. I consider that Mr. Herbert Spencer must be deficient in this spiritual principle which we all recognise and believe in, and which he himself would recognise if he would only look for it. I believe Mr. Herbert Spencer says that the mind is an emanation of the brain. Huxley, Darwin, and Tyndall say the same. They believe in mind, but only as an emanation of the brain; consequently they must believe that the mind is mortal. If they believe that the mind is not the soul itself, but one of the component parts of the soul, therefore it follows that there is no such thing as soul; for, if the mind be mortal and a component part of the soul, the soul is mortal also,—therefore there can be no such thing as a soul in the ordinary sense, and no such thing as immortality. If Mr. Herbert Spencer believes this, then I ask where can the consciousness of the past be obtained? Because we are told that the human frame decays—the body, the bones, and the brain,—once in every seven years, and that being so, where can the memory of the past exist? Where is the storehouse; where can the memory of yesterday, or of last week be? We have been told that for every thought created there is a cell of the brain that bursts. If the soul is so intimately connected with the body that when the body dies the mind must die too, then the thoughts must die. I would here ask permission to read a few lines from a sermon preached on the death of the Earl of Beaconsfield, an extract offering a strong proof of the immortality of the mind. There is, I think, a wrong conclusion generally come to on the death of old people—some of us here may have come to the same conclusion,—and that is, that as people grow old and feeble, the mind becomes weak. Now in the case of the Earl of Beaconsfield we find that this was not the case, and I might mention hundreds of other cases of eminent men who have retained all their mental power when the body was more feeble than at any other time, and I regard this as a great proof of the fact that the mind is independent of the brain and of the corporeal system. Canon Liddon, in his sermon at St. Paul's Cathedral on the occasion referred to, says:—"If he (the Earl of Beaconsfield) had ceased to exist, it would be natural only to reconsider again and again the years of varied and brilliant effort which closed on Tuesday; but in that temple of truth they might not thus palter with reality. None ceased to exist at death, and when the human mind gave some evidence of many-sided and vigorous power up to the very moment of dissolution, we seemed to have before us a sensible basis" (I bring this forward as a strong argument that the mind ceases not after death) "for an independent conviction" (and I put this in opposition to the theories of Mr. Herbert Spencer) "that it lived after the catastrophe which had rent it from the body." (Applause.)

The Right Hon. the Lord O'Neill.—I have really very little to say upon this subject. I perfectly agree with the argument used by the author of the paper which has been read to us to-night. The only matters for notice on my part that would occur to me are some of what may be called the *obiter dicta* in the paper. There was one thing I rather regretted to learn, and that was that the doctrine of evolution has become the accepted doctrine among scientific men all over the world. I had hoped that that was not the case. There have been many very eminent men who have refused to accept that doctrine,—among others the well-known Dr. Virchow, who says we are further from arriving at such a conclusion now than we have ever been. But, however, I do not profess to know much about the state of the case, only I should hope that there are many practical men who do not believe in that doctrine. I have myself taken occasion more than once before this Institute to express my belief that even if that doctrine were established it would not be found to contradict Scripture; but at the same time I do not think it can be accepted as a scientific doctrine, and it has certainly the *primâ facie* appearance of contradicting Scripture. I should, therefore, regret very much to think that it was becoming the universal doctrine of scientific men. I think this is all I need say on the subject, beyond the remark that I quite agree in all the conclusions arrived at on the main subject of the paper. (Applause.)

The Chairman.—I may say that I noticed the same expression myself, and entirely concur in the observations made by Lord O'Neill on the subject; but I think it would be well to remember that "The doctrine of evolution" defines nothing. The term implies many theories and views, of which the only consistent one is that of Haeckel, who traces evolution from no creative act "in the beginning"—who, in fact, considers matter eternal. Now, Darwin does not take this ground, but speaks of a Creator, and his system is very different from that of Haeckel; while Wallace, again, makes man a being with a spirit, and quite a different creation from the ordinary animal. So that we cannot include under the one phrase "the Doctrine of Evolution" so many different theories. Neither do I at all believe that any doctrine of evolution has become the universally-accepted doctrine. Perhaps we all, in a certain sense, believe in evolution; that creation has been a process of successive stages, and that a great deal that looks like development has been in the creative plan from the beginning.

The Rev. Prebendary IRONS, D.D.—I have listened to Mr. Ground's paper with unmixed pleasure. The points that have been objected to by one or two preceding me do not seem to me to touch the main course of the argument at all. I fully went with the first speaker in saying that the estimate formed of Mr. Herbert Spencer was somewhat exaggerated, and yet I have to acknowledge the great admiration I entertain of Spencer's style, and acuteness and power of analysis; and I do not think we gain anything by depreciating our opponents. There is a sentence in the paper which slightly expresses what I mean on this subject. It is quite at the beginning, where the lecturer says there may be a spiritual element added to the other elements of the Spencerian philosophy without disturbing its main features. I hope it is so. In the last century, we know, the doctrines of Locke were wholly pre-eminent. Every one adhered to them; and they have left us a terrible legacy. Locke's teaching that there was nothing whatever in the intellect that was not first of all in the senses,—though corrected by Coleridge's adding that there was the intellect itself,—was still a great calamity for the philosophical world. It tinctured the whole line of thought in this country and in France. Up to this day we have in consequence of the Lockeian philosophy lost our hold of the *à priori* to a large extent. As has been stated on former occasions in this room, we shall have to go through a great deal of hard thinking and powerful semi-infidelity before we shall get rid of the mischief that has been done by the suppression of the *à priori* in the philosophical thought of England. You will find, however, throughout Herbert Spencer's works that they take it for granted that there is an *à priori*. He does not at any time really ignore it, and this may be thought to encourage the hope that some day he will think as we do. Passing now to the higher subject sketched in the paper before us, it is not to be doubted that Mr. Herbert Spencer acknowledges mind to be an entirely distinct being from matter; and yet he says *we* can only speak of mind in terms of matter, while on the other hand *we* can only speak of matter in terms of mind. *Who is it*—this *we*—we ask, that is doing all this? Spencer seems to admit the *ego*—the personal being—that very self who is able to handle both mind and matter, and to deal with them in its imperious way, using its own instruments to some extent as it will. It is this third element that I want Mr. Spencer to make something of. If he will only bring out his conscious *self*, and show what the Person is, which surely after all demands our study, he might soon move on from that personality to the acknowledgment of a personal Deity; and then to the rest of those doctrines of a higher philosophy which he now and then hints at, but never yet has fully explained. I am sorry that he stands where he does, yet I think it is right he should think out and exhaust Lockeism, which is what it seems to me he has not done. Until that is fully accomplished the philosophy of the future will be very little better than the philosophy of the past. When we have pushed our explorations of mind to the uttermost limits we are referred to matter, he says, for the final answer. Now, "we" are the third party. He tells us there are mind and matter to start with, and then he introduces the demanding *ego*,—the person who is to deal with the whole subject. He should here define surely what he means by the "agnosticism" he professes. He scarcely has done this, because it does not suffice to tell us that agnosticism means a confession that we do not know. Within a certain region we do know. The Gnostics of the earlier Church—the Gnostics of Christian times—were in the habit of attempting the realm of the unseen, and there speculating. We object to this; and although Clement of Alexandria thought fit to call the true Christian a Gnostic he did not call him so in that sense, but in another, viz., as truly wise; which I must not detain you by dwelling on. Now, modern Agnostics, those who do not know those things which the Gnostics professed to know, ought to tell us more distinctly that they are only Agnostics beyond the sphere of the physical, where they have no perceptions. They would know everything in the sphere of the physical, but beyond that they admit themselves to have no natural knowledge whatever. They are quite right; and in that sense every Christian is an Agnostic so far as his natural knowledge is concerned—he has no formal knowledge of things unseen by the aid of merely natural faculties and powers. We have no exact knowledge of causation. We can recognise that in the physical world in all its departments there is evidently a causation of various kinds; but we cannot penetrate any farther. We are shut up in the limits of the physical. We can go no farther than acknowledging that there is an unseen world beyond, in which lie causation, contingency, the power of conscious action. These at once take us into another sphere: they are utterly beyond the physical, and if people would only honestly tell us that they mean no more by their agnosticism than that the natural man discerneth not things of the Spirit, I should quite agree with them. I here put it into more theological language than I should care to force on them at the outset; but I think they are bound to tell us that the unseen which lies beyond the phenomenal world, does contain the realities without which everything in the seen or physical world would have been unknown. Mr. Herbert Spencer exhausts a great deal of space in order to prove this, or nearly to prove it; but he is indistinct, and will not come to the point with the broad statement that in the world of the unseen lie all the powers which originate what he calls "forces." Professor Tait and Mr. Balfour Stewart almost deny that there are such things as forces: they wish to get rid of the word altogether. It is very difficult for them to find place for forces in the physical universe. Forces lie beyond: call them by what name you will, they lie beyond. If once Mr. Herbert Spencer would deal effectually with this question of the causes of the physical which lie in the unseen, he would have less difficulty in finding out the God whom we adore, who is the Cause of all things finite, and who by His infinite power is able to produce all things out of nothing. I wish to pause a moment on this expression—"all things out of nothing"; because Mr. Herbert Spencer further on in his book on *First Principles* distinctly denies that anything can possibly be conceived to have been made out of nothing. Now, if there be an originating power at all, it is that which gives us something that was not before. It is folly to admit causation and origination, and to dispute that there is beyond this world a power that can make things out of nothing. We ourselves, as originators, as causes, are shadows of Him who has placed His image upon us. Every time we exercise the power of thinking we are conscious that we have thoughts which came out of us we know not exactly how, but certainly not from conscious material. We, as finite beings, are as shadows of the infinite God, whose likeness we bear. We are intelligences, we are makers and originators. We, too, make things out of nothing. A great author and poet is a maker, an originator, a cause, and to some real extent he causes things to be which were not. Sometimes he makes up existing materials, but even then there are flashes of truth, there are pictorial and real illustrations which come from the man himself. As the infinite and eternal God speaks to us, it is done: the action of the Divine Will is not inoperative. We cannot conceive of God as a Great Being who has both power and will, without also understanding that His will does something; that His power is effectual power. If you work out this thought you will find that something out of nothing is a logical result; but if I am detaining you too long, I ask your forgiveness, and will only add a few more words. The paper before us seems to me, with the exception of the laudatory matter which I should in some degree, though not very much, be inclined to modify, to be quite perfect in expression. It is exact, it is logical. It adopts a way of putting the whole subject which Mr. Herbert Spencer is bound to notice: and I shall look forward also to a promised second paper from our lecturer with the deepest interest, because it will take us into the region of the ethical. When we see indeed the manner in which Mr. Herbert Spencer's philosophy is bound to evade ethics, I think we should stint our admiration of the moral tone pervading (as the paper hints) Mr. Herbert Spencer's book. But this, perhaps, is hypercriticism. I can quite understand that the refinement of the society in which Mr. Spencer moves has produced a tone and temper in him which may be called, and which doubtless is, moral and refined, and in that sense he displays a grace and sensitiveness and a reality which we may well imitate. Now and then he is hard on the theologian, but being a theologian myself, I can without effort say I forgive him. The fact is that he does not understand us, though he may and probably will understand us, if he will but try, and among our many philosophers may one day achieve a lofty and permanent place.

Mr. W. GRIFFITH.—It is, perhaps, unwise in criticising the opinions of an author to concede too much in praising him too highly, or, on the other hand, to treat him with injustice in order to avoid doing so. It may be proper to consider the position which Mr. Herbert Spencer holds in connexion with the sceptical philosophy of the present day. Hume began with an hypothesis and ended in doubting everything; Mr. Herbert Spencer begins by doubting everything, and concludes by believing a great deal. This is certainly a great step in advance, and upon that we may congratulate ourselves. But while admitting that Mr. Herbert Spencer has achieved so much as to convince himself that there is something beyond matter in the realm of thought, I do not think that we ought to say that his effort is the last and probably the greatest attempt to present the true philosophy of the cosmos. If we see anything of philosophy in what he writes, philosophy will tell us that he is treading in the steps of those who have gone before him—men like Descartes, who held that matter consisted of certain minute particles—atomic particles—estimable in quantity, but destitute of all qualities impressed by a Creator; yet even Descartes was not original in this theory. Democritus, himself, admitted as much, and believed in what is sometimes called the atomic theory, which dates from the time of Empedocles and the Ionic philosophers, who sought an explanation of the phenomena of nature in the supposition that the forms and modifications of matter are the cause of all things. It was to Anaxagoras that the Greek world was indebted for the suggestion of a higher cause called νους, mind or thought. Mr. Spencer is beginning to think that there is such a thing as thought, but is not sure whether it is always dependent or can be independent of matter. I was somewhat surprised when the author stated that the systems of philosophy encountered by St. Paul were, as compared with that of Mr. Herbert Spencer, but as unproved assertions to the deductions of exact science, or as crumbling sand to solid granite. I do not understand how any one who has read the works of Aristotle could be disposed to adopt this conclusion. Aristotle lived in that period of Greek history when every theory of the universe had been, or was being, thoroughly investigated, when the atomic theory of Democritus was fully sounded, and when the νους of Anaxagoras and the Δημιουργός of Plato were well considered, and he came to conclude, with the other great thinkers of his day, that philosophy had arrived at the final solution that the intelligence which existed in connexion with matter involved a higher intelligence independent of matter, an intelligence which was the same as the Supreme Creator of the Universe, of whose will and expression matter was only the product. I have hitherto been dealing with the historical points of the subject; but with regard to Mr. Herbert Spencer, I may say that he has advantages which the ancient philosophers did not possess. The science of the material has made great advances, and all the facts that have been collected during the centuries that have passed since Aristotle's time, have been at his disposal. Whether he has made a good use of them is another question. It is to be remarked that the grand results which Aristotle achieved tended to prove that matter is the creature of mind, and that mind is the great expression of the Creator; while the philosophers of the dark ages, studying the logic of Aristotle, have merely used his terms of reasoning in connexion with *à priori* topics that led them into much metaphysics that have been useless and unsound. Fortunately, in the progress of the human mind, Bacon appeared, and he wisely adopted the experimental view of proving all his conclusions by an appeal to facts, and on this point I somewhat differ from Dr. Irons. I do not think he has done full justice to the *à posteriori* mode of philosophising. If it were not for our investigation of facts as they exist, our natural science would be in as backward a state as that of the ancient schools; our knowledge of the solar system as dark as that which preceded Copernicus, when it was maintained that the earth was the centre of the solar system, and that the sun revolved round the earth. Now, Mr. Spencer, in connexion with these questions of fact, has undoubtedly achieved—what? He has had the advantage of the collective knowledge of previous investigators. Has he made good use of it? Unfortunately, he has not proceeded as far as he might have done. He has advanced beyond the theory of Democritus and fallen short of that of Anaxagoras, and says that there is a human mind in connexion with matter, and not independent of matter, making the ultimate notion of mind merely the pulsation of the nerves. This, of course, brings us back to the old theory that mind and matter are inherent one in the other. Still, while we wish to do full justice to this author, we must admit that he is deficient in logical accuracy. It is very certain that Mr. Herbert Spencer falls far short of the truth, and it is on this point that I think the author has achieved a great deal in showing that the system of Mr. Herbert Spencer is illogical and inconclusive. It is now many years since I studied Dr. Carpenter's "Comparative Physiology," and I cannot but think that our new philosopher has borrowed from that great authority, and drawn inferences from the borrowed facts which the late learned Registrar of the University of London would repudiate. Whether or not that be so, the system, if system it can be called, of development is fanciful, imaginative, and a speculation. It is inconsistent with the facts of chemistry, which show with irrefutable exactness that combinations of isometric equivalents of the same elements produce totally different inorganic results, the properties and power of the products being different. In other words, qualities of matter are fixed, and fixed independent of the atoms. Mr. Herbert Spencer is merely proceeding in the darkness in which he has lived, and has not yet arrived at that full light to which the careful consideration of the facts of the case should have led him. And here I think that there is great force in what Professor O'Dell has said, namely, that if we carefully consider the facts existing around us, we are bound to admit that there is a spiritual element in our nature. If we take the great novels and plays—the mighty works and dramas of men like Shakspeare—we must confess that the whole of our literature, ancient and modern, goes to prove that there is a spiritual element altogether independent of materialism. We need only do what Mr. Herbert Spencer himself has done, appeal to our own consciousness, and we must at once admit this; and here, again, we must remark another error in the Spencerian theory. He says that truth and error, or, to use his own words, mendacity and trustworthiness, would become identical unless we accepted the verdict of consciousness that they differ. I would say at once that the consciousness of one individual is not the test to another man of truth or error—that virtue is a thing that is independent of the consciousness of any particular individual. Whose consciousness are we to take? Is it to be that of Mr. Spencer or of some one else? For, the more individuals we take, the more difference we find in individual minds. Therefore, I should differ from Mr. Spencer in making any question of mendacity or trustworthiness dependent merely on the consciousness of an individual. I would rather appeal to the verdict of mankind, and say there is a spiritual element independent of these things, and that on this point Mr. Spencer falls short of the truth. Another objection to his theory is the terribly nugatory character it possesses. It must necessarily follow that if we once accept it we shall find that all good things will cease; and if there be no future, why should we not say, "Let us eat and drink, for to-morrow we die"? But the common sense of humanity—to use no higher argument—at once condemns this. The paper before us contains so many propositions that it is impossible to deal with them all. We can but touch on a few points as they arise, and I must conclude by thanking the author for a very interesting and useful paper on a subject of much importance.

Mr. L. T. Dibdin.—I have heard a great many papers read in this room, but never one that seemed to me more clear. It deals with a great subject so ably as to be almost inimitable. I think that whenever Mr. Herbert Spencer comes to read this paper, and to reply to it, as I consider he is bound to do, he will have no easy task. I am not altogether disposed to concur in all the statements that have been made upon the paper, and should like to allude to the remarks of one speaker, who seemed to say that the great argument to be applied to this subject was that adduced by Mr. Herbert Spencer himself, and founded on consciousness. Everybody admits that the argument from consciousness is a very strong argument, but I do not think it can be fairly carried to the extent to which that speaker carried it; if so, it would have been unnecessary to write this paper. The argument from consciousness must not be pressed too strongly, so as entirely to overweight and countervail arguments of a purely logical character; because, though I admit that if the result of argument were found to be in direct contradiction to the teaching of mere consciousness, probably with the majority of mankind consciousness would decide the matter, yet it will not do, unless there be absolute contradiction, to assume this. I say so for this reason: consciousness is not always a safe guide, and we cannot always lay down the precise conditions under which it is a safe guide. But I should like to call attention to something in the paper we have heard read to-night. I do not wish to throw any doubt upon it as not being clear; on the contrary, it is one of the clearest argued papers I ever read, but when one has read it only for the first time one may very fairly fail to grasp its full intention. This may have been the case in regard to the argument of the author on the quotation from Herbert Spencer, given on the 69th and following page of the paper. I do no know whether I have gathered the force of Mr. Ground's comment upon that; but it would seem that Mr. Herbert Spencer begins by laying down the doctrine of the growth of energies—the development of one energy out of another, and that he then assumes the connexion between mental and bodily energies—asserting that all our energies are developed out of other energies, and that therefore the mental energies may be developed out of the physical energies. This brings us to what is the real vice of the whole of Mr. Herbert Spencer's reasoning, and that is, that he does not show the point when the advance from the lower stages of creation to the higher comes in. Whatever may be the case as to evolution, whether it is a true doctrine or not, I do not say; but every philosopher will admit that it is a very plausible theory, and so long as Mr. Herbert Spencer is simply evolving one physical existence out of another—not a higher one—he has a fair field in which he may have a great deal to say; and afterwards, also, when he has introduced mind, and is trying to bring that from a lower to a higher state, he has a good deal to say which I think Mr. Ground will admit is very difficult to answer; but it is on this point *where mind comes in* that I think it impossible to follow Mr. Herbert Spencer's arguments. This quiet passing over of the very critical point of the case, reminds me of a story told of an eminent living judge who was once a very successful advocate. He was arguing before the late Lord ———, who in his latter days suffered a good deal from a tendency to go to sleep on the bench. The advocate's case was very good up to a certain point, where, however, it was very weak. Knowing where this weak point was, the advocate was very loud and sonorous till he came to it, when he adopted a very soothing tone of voice, and Lord ——— went to sleep. After he had got over the weak point he became very loud and demonstrative again, the result being that Lord ——— woke up and decided in his favour. Now, this seems to be very much like the way in which Mr. Herbert Spencer treats the introduction of mind into the universe. There is another assumption that follows on this as a sort of corollary, and that is, that the growth of mind is proportionate to the development of the physical existence; that is to say, that as we get into the higher types of physical existence mind must necessarily show a higher phase of development. These two assumptions go to the bottom of what has been criticised in the paper to-night. There is one point about the eye to which attention is drawn on page 74. It is very beautifully put, and the passage is one that we may well read over again when we get home. It reminds me of a paper read many years ago by the late Rev. W. Mitchell. I am sure that Dr. Irons and other old members of the Institute will well remember how, in the early days of the Institute, when Mr. Reddie occupied the Secretary's chair, Mr. Mitchell read a paper on Lyell's development of the eye from a physical point of view, and how he demolished that theory altogether, and by that paper laid, to some extent, the foundation of the high reputation of this Institute. This criticism on the same argument, from a logical point of view, is a fitting corollary to the other. I should like to point out how the same assumption, as to the introduction of mind, runs through the whole of this material philosophy. Mr. Herbert Spencer, of course, treats the subject from a philosophical point of view; men like Professor Tyndal treat it from an experimental point of view, but whenever they attempt to formulate any system, and to bind mind to matter, they do exactly the same thing, and assume the point where mind is initiated. I notice that the paper before us is full of strong language. Mr. Ground uses some hard expressions in regard to Mr. Herbert Spencer, in phrases that strike very oddly, especially on a lawyer's ear. But is there not a cause for this? In page 76 the author says, "Some of the consequences of this sin we stated at the beginning in the shape of hundreds and thousands of lives bereft of all faith in God and the unseen, through this far-extending falsehood!" This is the reason why these matters are not mere matters to be discussed, like any ordinary intellectual propositions, on the result of which serious consequences do not depend; they are, on the contrary, matters of the very first importance. I know that I ought not to enter upon political topics here, but I cannot help referring to the significant commentary which the question, probably at this moment in the Bradlaugh debate in the House of Commons, affords on the present subject. It should ever be remembered that the philosophy of Mr. Herbert Spencer is but a higher and refined development of the coarse and brutal atheism of Mr. Bradlaugh. (Hear.)

Professor GRIFFITH.—In reference to the first passage in the paper quoted by the last speaker, the author, after giving a very beautiful extract from Mr. Herbert Spencer's book, says: "All this we may concede, adding only this proviso—that as every antecedent force which generates an action must operate in the same region as that action, must be *in eadem materiâ*," I should like to ask, first of all, what is it he means by *in eadem materiâ?* and next, what is his authority for the introduction of this exotic proviso? Where is his proof that cause and effect must always be in the same plane? Touch fire, and it shall give you pain. Do fire and pain belong to the same sphere of being? Strike the keys of the piano artistically and you have music. In that case you have, first of all, mental energy moving the fingers and then the piano. Next, something in the ear is moved by air-vibrations, and the nerves are set a-going. Then follows musical feeling. I therefore ask, cannot causes in one plane produce effects on quite a different plane? Let us touch another point: "The magician is going to pass from the extended beam of light (for to the scientific imagination the matter of which light is composed has surface and weight as manifestly as a cannon-ball), he is going to travel logically from this extended beam of light to the unextended mind." I must ask, is this quite fair? I am sure the author means honestly; but I am none the less convinced that this is based on a serious misapprehension. Mr. Herbert Spencer is the last man in the world to mistake visualization for particles of matter, or to confound mere physical light, even on the old corpuscular theory with the immediate act of seeing. Light, or the force of light, does not consist in dead particles of matter, but in the energy, the divine or God-given energy, which has sent it into space at the rate of thousands of miles a second, and which has caused those particles to impinge on the eye. It is the motion, not dead weight, but the *vis* of appulsion. Mr. Spencer does not call force a physical thing. To imply that he has the slightest sympathy with any such notion, is to do him serious wrong. His argument does not run in that direction. There is another point. "Matter can never touch mind." Are we quite sure of this? Will not a diseased brain touch our mental conceptions? Are the effects of pain limited to the bodily frame? But even if we were to grant that matter can never touch mind, we must admit that mind can touch matter. You will perceive this by moving your arm; and that is all that Mr. Herbert Spencer's argument requires. Mr. Spencer never urges that spirit may rise out of matter. The question with him is, can matter rise out of spirit? Is there a factual dualism, or is matter nothing else than a simple *exterioration* of mind—a subjective shadow—projection of our inner self-hood? There is a great deal more I should like to say; in fact, I should like to give an hour to each of these phases, and half an hour to compliment my friend, Mr. Ground, on the paper he has read. From the bottom of my heart I congratulate him on the tone of his criticism, for, notwithstanding it is a rather harsh criticism, there is no bad feeling from beginning to end; and I must also congratulate him on his keen appreciation of the noted author he has undertaken to grapple with. I repeat that I congratulate Mr. Ground from the bottom of my heart; but, in conclusion, I must submit that I think the bridge he has built for us from subject to object, from non-life to life, is very beautiful, but I should be sorry to trust my life to it.

Mr. W. Ogle, M.D.—It has long been my earnest desire that an Institute established for the examination of those propositions of science which touch especially on religion, should give Mr. Spencer's views full consideration. It is quite possible that his doctrines, though taken up before, have never been treated with so much effect, and I think that we are very much indebted to Mr. Ground for the way in which he has dealt with them. We are also indebted to him for having given us so much of Mr. Herbert Spencer in so small a compass. Also, though I am somewhat startled by the expressions of admiration regarding one towards whom we are in the position of opponents, I think it is a very great advantage that the person we oppose should be put before us in the best possible way. I feel that this is certainly an admirable point in the paper. But I really have risen to-night very much because I am so seldom here, and I wished to say how great an interest I take in this Institute. I hope that the papers that are to come from Mr. Ground will, in God's providence, deal with some of those other teachings of Mr. Spencer which ought to be taken up by the Victoria Institute. I allude especially to his system of Sociology, in which, if I have been rightly informed, he endeavours to claim that Sociology shall be regarded as a true science—a conclusion which I believe to be perfectly sound. But I am no less certain that there is some fundamental error in his mode of establishing this proposition;

because in his system, unless I am greatly mistaken, those social laws which are derived, not from experience, but immediately by revelation from God's word, are ignored. A Sociology which ignores a personal God and lawgiver must be, to say the least of it, as incomplete as would be a solar system in which no reference is made to the existence and influence of the sun. I look to the Victoria Institute to set Mr. H. Spencer right upon this point.

Mr. Ground.—I have to thank the meeting for the very kind way in which it has received this paper. As there is very little time remaining to me, I must apologise for having to pass by very much of the criticism by which the paper has been met, but which I am very glad to have heard, and about which I may say a word or two. I would first refer to what has been said as to my references to Mr. Herbert Spencer's genius. It is possible I was over-impressed by this, but I read his philosophy at a particular time, and as I read it I thought that although never before had I met with any argument which in the least degree seemed to shake the foundations of Revelation, yet that here was something which, unanswered, was certainly startling, and might have that effect. In that state of alarm Mr. Spencer loomed as a giant before me, and perhaps I thought his proportions greater than they are. We seldom do estimate aright a living man. We need to portray him on the canvas of Eternity, if his true shape and size are to be seen. I feel sure, however, that some in this Institute greatly underrate Mr. Spencer,—a mistake which, in my judgment, would, if not corrected, bring disastrous consequences, but it is possible that I may have gone to the opposite extreme. In reading his Philosophy I am distinctly conscious that vaster thoughts are before me than when reading Shakspeare. Shakspeare one can take up any time, as the companion of any idle hour, and the amount of mental stimulus he gives is relatively trifling. Not so is it with Spencer. It is only when the eye is keenest, the will strongest, the nervous force most abundant, that you can be sure of following him. The first carries you through the gentle undulations of an English county, and his highest elevations are hardly so much as going up Snowdon or Helvellyn, but Spencer carries you up the awful Alpine ranges, where the spaces of thought over which the eye roves are incomparably vaster, and where the exertion demanded is far greater. Spencer has a certain Miltonic grandeur. I could name places in his Philosophy where views are given us of creation in which, if we add the spiritual conceptions of which I spoke, the idea presented rises, to my mind, in extent, sublimity, and overpowering greatness, above everything I have yet met with in all uninspired literature. To grasp his system is like standing in the Sistine chapel, and bearing the full weight of the conceptions of Michael Angelo. Whilst this fact explains the fascination Mr. Spencer exerts over many, it also shows us the great danger either of letting his system continue, as it no doubt is, the reigning philosophy of the world, or of depreciating it below its just value. So long as it remains enthroned, a deadly paralysing force is exerted on all the higher circles of thought, and all the freshest and most ingenuous spirits; and out of this force an infidelity of a very terrible type can hardly fail to come.

One of the speakers took exception to my statement that "the systems of philosophy encountered by St. Paul were, compared with this system, but as unproved assertions to the deductions of exact science," and he cites the works of Aristotle as exact and severe deductions. In reply I would say that I am not aware that St. Paul conflicted with Aristotle. There was much in the old systems which was true, which could be at once accepted. What was not true was only mere flimsy speculation, and had no solid argument to back it. But in Mr. Spencer's system we meet with what seems, and often is, severe scientific reasoning, leading up to a conclusion opposed by Revelation,—*i.e.*, from premisses *the truth of which we are forced to grant*, we are led *by exact logic* to a *conclusion from which we recoil.* St. Paul, so far as I know, never met a case of this sort. The only parallel instance is St. Stephen, and it needed his glorious Defence in order to make evident to men where the sophism lay.

Reference has been made to the indefinite* nature of the phrase "the Doctrine of Evolution," and questions have been raised as to the area over which it is accepted. I understand the phrase to mean the doctrine that all the different orders and genera of the animated world have been evolved,—some say, with a few breaks; some, without any break,—from one primary root, the whole world of life being one organic whole; one class of animals growing out of another class as the branches and twigs grow out of the trunk of a tree. Now that this doctrine, with various slight modifications, is held by the majority of the leading men of science in all countries of the globe, seems to me a fairly ascertained fact. In Dublin a scientific man told me that three-fourths of those he knew held it. I have heard similar statements elsewhere. I am told it was almost universally accepted at Cambridge ten years ago. Professor Huxley, on the Jubilee of Darwinism, said that it had now made good its claims to rule the scientific world, and must henceforth be regarded as the only tenable hypothesis yet propounded. I think these authorities fairly justify my statement.

Permit me to thank Prebendary Irons very warmly for the exceedingly kind and appreciative way in which he has spoken of my paper. There is just one little point where I do not understand Spencer to have the fault attributed to him. Mr. Spencer denies that we can conceive of something having been made out of nothing. This Dr. Irons combats. I understand Mr. Spencer here to mean, with Sir William Hamilton, that the *act of creation* is by us incomprehensible. Now, to conceive or comprehend the *act of creation* would be to link together in our thought two propositions—something; nothing—one of which—nothing—cannot come into thought at all. No effort of ours can bridge over the logical chasm between something and 0. Hence the act of creation can never be thought. We can trace the Divine Power in creation from the moment it comes into sight and becomes something, but we cannot pass into that region, to be traversed by Deity alone, whence the power issued. As Hamilton showed, we can construe the act of creation only by conceiving the power manifested in creation to have been before existing potentially in the Person of the Deity, and to have come into an existence cognisable by us by his creative *Fiat.* Now to reply to my esteemed friend Professor Griffith. He asks what is my authority for saying that cause and effect must be *in eadem materiâ*, in the same plane. He instances fire and pain; motion of the keys of a piano, and our sensation of sound, in both of which he affirms the cause is *not* in the same plane as the effect. To this I beg to demur. It is the physical nerve which is submitted to the action of the physical fire, and these are in the same plane. It is the mind that feels in that nerve, but it is the nerve to which what causes the feeling is applied. As for ourselves, we are both mind and matter, and hence are open to receive impressions on both these sides of our being. In the same way, Professor Griffith's illustration of the motion of a piano's keys and our sensation of sound seems to me unable to prove his assertion. The waves of [physical] air made by the motion of the strings of the piano beat upon the [physical] auditory nerve, which nerve since it is matter, can receive their impact, and since it contains mind can also interpret that impact in terms of consciousness. I submit, therefore, that in both the instances cited Professor Griffith is altogether wrong. I have a very profound sense of the value of his judgment in general, but, on this occasion, I am utterly unable to regard it as sound or just. In conclusion, permit me to thank him, and you all for the very kind way in which my paper has been received.

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* See Chairman's remarks, p. 82.

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(The meeting was then adjourned.)

Further Reply by the Author.

During the meeting I was unable to make out the exact drift of the second part of Professor Griffith's criticism, wherein he stated that I had seriously misapprehended Mr. Spencer's meaning. I have now had some conversation with him, of which he kindly permits me to make use:—I gather that he deems Mr. Spencer to hold and state in his Philosophy, the doctrine that there is a force beyond the phenomenal, in which implicitly resided not only all the matter but all the mind that is in the universe. Mr. Spencer, according to him, attempts nothing more than to trace the working of this force in our mundane sphere, in its twofold aspect of mind and matter remaining all the time *profoundly conscious of this immanence of the Unseen*, and, in his own conception, tracing all things as evolved from it. Thus in Professor Griffith's idea there is, in the system, a power, not unlike the Fates in a Greek play, who rides high above all the multiform events of life, and ordereth them all after the counsel of His own will. According to him, Mr. Spencer's Philosophy is a sublime Theophany, and the danger with which it threatens us is the resolving of all things into God—a more vigorous Spinosism, carried out on a larger scale! To this I beg to reply:—

1. Even if true it makes nothing against my argument. Mr. Spencer has no right to travel from matter to mind without saying, if this indeed be his notion, that he regards matter as originally endowed, before it came into

the phenomenal world, with all the powers and potencies of mind. Never a line has he written, so far as I know, which can be tortured into this.

2. My reading of Mr. Spencer's works leads me more and more in quite another direction. Each fresh examination thereof impresses me more clearly with the conviction that Mr. Spencer owns no God but Force, and, I fear, Force Irresponsible, Impersonal, Unintelligent. Even where he has most clearly drawn the outlines of the God of Love, he gives never a hint that he himself can see the picture; he seems to me like an artist who paints most carefully each feature, but never penetrates to the soul which dwells in the features, and lights them up with living beauty. Only those who can bring this spiritual setting can, I fear, see a spiritual element in Mr. Spencer; my friend, Professor Griffith, has it in large measure, and it is I think the loftiness of his own nature which puts into Mr. Spencer's philosophy an element others cannot detect. A celestial rainbow does sometimes hang over the thoughts; Mr. Spencer supplies the raindrops, and puts them in the right angle for our eyes, but that which gives the glory is light from above.

3. The influence exerted over a wide area, and for the last twenty years, by Mr. Spencer's system has certainly not been of a character to impress men more profoundly with the sense of the immanence in nature of an ever-working, all-glorious mind. Mr. Spencer has in that time stimulated thousands of men; the currents of thought he has thus caused have mingled, more or less completely, in one broad stream, and that stream has certainly not carried nearer God. Now if the whole tendency of his system is to set forth God, if it is a lofty philosophical Calvinism, if each sentence is penned for that end, it is passing strange, it is incomprehensible, that the sum total of the resultants of its influence upon thought should drive God farther away from men's minds. This seems to me to amount to a *reductio ad absurdum.*

4. It seems to me irresistibly droll—a good philosophical joke—that Mr. Spencer should be deemed another Malebranche, giving us a second "Vision of all things in God." I can but think that no one would be more astonished to learn it than Mr. Spencer himself.

For these reasons, respecting as I do Professor Griffith's judgment, I could not accept it in this instance, with my present impressions, without utter mental dislocation.

ORDINARY MEETING, April 4, 1881.

The Rev. R. Thornton, D.D., Vice-President,
in the Chair.

The minutes of the last meeting were read and confirmed, and the following elections were announced:—

Members:—J. Barton, Esq., B.A., M.I.C.E., Dundalk; Rev. H. Newton, M.A., Driffield; Professor F. C. Patton, D.D., LL.D., United States.

Associates:—Rev. M. T. Spencer, M.A., Wingham; E. G. Vickery, Esq., Government Survey, New South Wales; Mrs. R. Witherby, Sen^{r}., Lee.

Also the presentation of the following Works for the Library:—

"Proceedings of the Royal Society."	*From the same.*
"Proceedings of the American Geographical Society."	*Ditto.*

[The arrangements in regard to the paper read at this meeting are at present incomplete.]

ORDINARY MEETING, Dec. 5, 1881.

Rev. Prebendary Row, M.A., in the Chair.

The minutes of the last meeting were read and confirmed, and the following elections were announced :—

Life Members :—C. J. Lambert, Esq. (Yacht "Wanderer," Pacific), London ; J. Mullens, Esq., New South Wales ; the Hon. H. D. Ryder, London.

Members :—J. Christie, Esq., Surrey ; Miss E. Cope, Warwickshire ; J. France, Esq., F.S.A., F.R.G.S., London ; C. Gray, Esq., New Zealand ; Rev. W. C. Holden, South Africa ; Rev. H. R. Huckin, D.D., Burton-on-Trent ; Rev. H. Kennedy, Tasmania ; Rev. G. C. Lorimer, D.D., United States ; Rev. H. C. Trumbull, D.D., United States ; F. A. White, Esq., London.

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Also the following presentations to the library :—

"Proceedings of the Royal Society."	*From the same.*
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"Proceedings of the Palestine Exploration Fund." *Ditto.*
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"Proceedings of the Sydney Observatory." *Ditto.*
"Proceedings of the Canadian Institute." *Ditto.*
"Proceedings of the American Geographical Society." *Ditto.*
"Proceedings of the American Philosophical Society." *Ditto.*
"Proceedings of the United States Geological and Geographical Survey.
"Bombay Meteorology." By C. Chambers. *From the Secretary of State for India.*
"Continental and Island Life." By Dr. J. W. Dawson, C.M.G. *Ditto.*
"History of Licking County." By J. Smucker, Esq.
"Isms, Old and New." By the Rev. G. C. Lorimer. *Ditto.*
"London Review." *From A. McArthur, Esq., M.P.*
"Israel's Wanderings." *From L. Biden, Esq.*
"A Pocket of Pebbles." By the Rev. W. B. Philpot. *From the Author.*
"J. L. Paschal." By A. Lombard. *Ditto.*
"Mosaic Authorship of Deuteronomy." By the Rev. A. Stewart. *Ditto.*
"The Refutation of Darwinism." By T. W. O'Neill, Esq. *Ditto.*

Also Smaller Papers from Professor Claypole, Enmore Jones, Esq., and the Rev. Dr. Sexton.

The following paper was then read by the author:—

AN EXAMINATION OF MR. SPENCER'S "THEORY OF THE WILL." BY THE REV. W. D. GROUND.

WE saw in a former Paper that Mr. Spencer made common cause with the Realist Philosophers in asserting that the deliverance of consciousness must take precedence of all conclusions arrived at by a process of Reasoning. In holding such an opinion he shows his own good sense, his philosophical grasp and acumen, his clear scientific conceptions, and his determination to found his system on none of the mere alluvial strata of the Mind, but to get down far beneath to the solid rock which is underlying all. Here we can be completely at one with him. Any product of Reason, any conclusion arrived at by Reason, can, in the nature of the case, only be an elaboration of the materials given by consciousness, and it is far better, if we want to know what is in consciousness, to examine and analyse its primary elements, rather than a finished elaboration of these, into which some other element may have been imported. Every man of science acts on this principle, and it is manifestly a dictate of common sense. A recent writer contends that Mr. Spencer's "metaphysical principles are empirical."* By this he can only mean that because Mr. Spencer shows that the Logical Laws are the slow growth in us, through unnumbered organisms, of much humbler elements of Mind, therefore they have been acquired by and are the result of the experience of those organisms. In my judgment such an argument is neither sound nor just, and it admits of a most effective rejoinder. Mr. Spencer may reply that, so far from deriving those Logical Laws from experience, he is, on the contrary, showing that they are the simple outgrowth of the one *à priori* principle which runs throughout the universe; he is showing that their roots stretch far away down, deeper than all things; he is assigning them an antiquity compared with which the date the Professor affixes makes them but of mushroom growth, and is giving them an authority which makes his *à priori* canon nothing more than their humble vassal.

So much Mr. Spencer might say on the ground of his synthetic system alone. But when in addition, in his analytic system, he expressly sets aside all possible rivals of the simple deliverances of consciousness, and proclaims his adhesion to consciousness alone, then it seems to me only fair and just to accept his disclaimer, and to regard his system as an honest attempt to found only on consciousness. The *à priori* is his structural element; his metaphysics are not empirical.

We have now to examine his Theory of the Will. He denies to the Will all moral freedom, taking up the position of the philosophical necessarian. Now, if Consciousness could be clearly shown to assert that we have a sense of moral Liberty, Mr. Spencer could be proved to contradict Consciousness on this point. No doubt some of the greatest philosophers, including Kant, Jacobi, Hamilton, contend that Consciousness does give us this sense of Freedom, and they attach to it the greatest possible importance. But others as strenuously deny it, and there is no more vexed question in all Philosophy. Leaving this, then, for the present at least, let us look at Mr. Spencer's reasoning on the matter.

Now, if Consciousness really asserts that we are morally free, there must be some break in Mr. Spencer's logical chain, since he asserts the exact contradictory. If, then, on examination we find such a break, it will so far be an evidence that Consciousness does make the assertion, and we shall then be in a position, when Mr. Spencer's arguments are swept out of the way, to look carefully and dispassionately at the whole matter. We shall find, I think, that here Mr. Spencer is singularly weak—so weak, indeed, that what he says scarcely deserves the name of reasoning.

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* Professor Fairbairn, *Contemporary Review* for July.

Let us, then, examine his theory.

Mr. Spencer's Theory of the Will is one of the most original and remarkable parts of his Philosophy. It will be remembered that he makes what is subjectively Mind to be, in its objective aspect, currents or motions of nervous molecules. He makes what we call Will, or an act of volition, to be the commingling, in one definite stream, of force, of a number of those nerve-currents, which, in a previous state of indecision, were colliding one against another. It is like many rivers debouching into a lake; they come rushing pell-mell; and this confusion in the currents represents, in its subjective aspect, the time of uncertainty; until, at length, one adverse stream has neutralised another, the lake becomes calm, and the one unobstructed current flows on; which current is the resultant of all the streams that there met. Thus it will be seen that Mr. Spencer's theory utterly denies the existence of any determining element in the Will itself; it makes the whole process to be merely mechanical, nothing more than the mixture of nerve-molecules. Or, to take another illustration of his theory from a contested county election. There are various polling places, where votes of various numbers are recorded—and these votes represent the different motives with their exact quota of weight—but *the result is arithmetically deducible from the completed polling-books,* and the delay in learning which candidate is returned arises, not from any contingency or uncertainty, but simply because time is required to arrive at the totals.

That such is Mr. Spencer's theory will be apparent from the following passages. He is describing what he calls Will, and he says:—

> "On passing from compound reflex actions to those actions so highly compounded as to be imperfectly reflex—on passing from the organically-determined psychical changes, which take place with extreme rapidity, to the psychical changes which, not being organically-determined, take place with some deliberation, and therefore consciously; we pass to a kind of mental action, which is one of Memory, Reason, Feeling, or Will, according to the side of it we look at." *

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* *Principles of Psychology*, vol. i. p. 495 (2nd edition, from which all quotations are made).

Again he says:—

> "When the automatic actions become so involved, so varied in kind, and severally so infrequent, as no longer to be performed with unhesitating precision,—when, after the reception of one of the more complex impressions, the appropriate motor changes become nascent, but are prevented from passing into immediate action by the antagonism of certain other nascent motor changes appropriate to some nearly allied impression; there is constituted a state of consciousness which, when it finally issues in action, displays what we term volition."*

Again he says:—

> "An immense number of psychical states are partially aroused, some of which unite with the original impression in exciting the action, while the rest combine as excitors of an opposite action; and when, eventually, from their greater number or intensity, the first outbalance the others, the interpretation is that, as an accumulated stimulus, they become sufficiently strong to make the nascent motor changes pass into actual motor changes." †

But, in order to show what is Mr. Spencer's reasoning on the subject, I must trouble you with a long quotation. He says:—

> "Long before reaching this point, most readers must have perceived that the doctrines developed in the last two parts of this work are at variance with the current tenets respecting the freedom of the Will. That every one is at liberty to do what he desires to do (supposing there are no external hindrances) all admit, though people of confused ideas commonly suppose this to be the thing denied. But that every one is at liberty to desire or not to desire, which is the real proposition involved in the dogma of free-will, is negatived as much by the analysis of consciousness as by the contents of the preceding chapters. From the universal law that, other things equal, the cohesion of psychical states is proportionate to the frequency with which they have followed one another in experience, it is an inevitable corollary that all actions whatever must be determined by those psychical connexions which experience has generated, either in the life of the individual, or in that general antecedent life of which the accumulated results are organised in his constitution.
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> "To go at length into this long-standing controversy respecting the Will would be alike useless and out of place. I can but briefly indicate what seems to me the nature of the current illusion, as interpreted from the point of view at which we have arrived.
>
> "Considered as an internal perception, the illusion consists in supposing that at each moment the *ego* is something more than the aggregate of feelings and ideas, actual and nascent, which then exists. A man who, after being subject to an impulse consisting of a group of psychical states, real and ideal, performs a certain action, usually asserts that he determined to perform the action; and by speaking of his conscious self as having been something separate from the group of psychical states constituting the impulse, is led into the error of supposing that it was not the impulse alone which determined the action. But the entire group of psychical states which constituted the antecedent of the action, also constituted himself at that moment—constituted his psychical self, that is, as distinguished from his physical self.

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* *Principles of Psychology*, vol. i. p. 496.

† *Ibid.* vol. i. p. 498.

It is alike true that he determined the action, and that the aggregate of his feelings and ideas determined it; since, during its existence, this aggregate constituted his then state of consciousness, that is, himself. Either the *ego*, which is supposed to determine or will the action, is present in consciousness or it is not. If it is not present in consciousness, it is something of which we are unconscious—something, therefore, of whose existence we neither have nor can have any evidence. If it is present in consciousness, then, as it is ever present, it can be at each moment nothing else than the state of consciousness, simple or compound, passing at that moment. It follows, inevitably, that when an impression, received from without, makes nascent certain appropriate motor changes, and various of the feelings* and ideas which must accompany and follow them; and when, under the stimulus of this composite psychical state, the nascent motor changes pass in actual motor changes; this composite psychical state, which excites the action, is, at the same time, the *ego* which is said to will the action. Naturally enough, then, the subject of such psychical changes says that he wills the action; since, psychically considered, he is at that moment nothing more than the composite state of consciousness by which the action is excited. But to say that the performance of the action is, therefore, the result of his free will, is to say that he determines the cohesions of the psychical states which arouse the action; and, as these psychical states constitute himself at that moment, this is to say that these psychical states determine their own cohesions, which is absurd. Their cohesions have been determined by experiences—the greater part of them constituting what we call his natural character, by the experiences of antecedent organisms; and the rest by his own experiences. The changes which at each moment take place in his consciousness, and among others those which he is said to will, are produced by this infinitude of previous experiences registered in his nervous structure, co-operating with the immediate impressions on his senses: the effects of these combined factors being in every case qualified by the physical state, general or local, of his organism.

"This subjective illusion, in which the notion of free-will commonly originates, is strengthened by a corresponding objective illusion. The actions of other individuals, lacking as they do that uniformity characterising phenomena of which the laws are known, appear to be lawless—appear to be under no necessity of following any particular order; and are hence supposed to be determined by the unknown independent something called the Will. But this seeming indeterminateness in the mental succession is consequent on the extreme complication of the forces in action. The composition of causes is so intricate, and from moment to moment so varied, that the effects are not calculable. These effects are, however, as conformable to law as the simplest reflex actions. The irregularity and apparent freedom are inevitable results of the complexity, and equally arise in the inorganic world under parallel conditions. To amplify an illustration before used:—A body in space, subject to the attraction of a single other body, moves in a direction that can be accurately predicted. If subject to the attractions of two bodies, its course is but approximately calculable. If subject to the attractions of three bodies, its course can be calculated with still less precision. And, if it is surrounded by bodies of all sizes at all distances, its motion will be apparently uninfluenced by any of them: it will move in some indefinable varying line that appears to be self-determined: it will seem to be *free*. Similarly, in proportion as the cohesions of each psychical state to others become great in number and various in degree, the psychical changes will become incalculable and apparently subject to no law.

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* There is evidently some mistake here, but those are the *ipsissima verba* of Mr. Spencer's work.

> To reduce the general question to its simplest form: Psychical changes either conform to law or they do not. If they do not conform to law, this work, in common with all works on the subject, is sheer nonsense; no science of Psychology is possible. If they do conform to law, there cannot be any such thing as free-will.*

If now we carefully take to pieces this tissue of elaborate argument, we shall find, I think, that there is hardly one sentence in it which does not contain either a glaring misstatement, a palpable fallacy, or a clear *petitio principii*. Let us take the sentences in order.

1. In sentences two and three he says that "the real proposition involved in the dogma of free-will" is "that every one is at liberty to desire or not to desire." Now as to whether this is a just statement of the problem, we will call two witnesses of unimpeachable character—Kant and Hamilton. Kant says, "We only mean by liberty that negative property of our thinking frame not to be determined to act by physical excitements."† Still more clearly he says, "The instincts of man's physical nature give birth to obstacles which hinder and impede him in the execution of his duty. They are, in fact, mighty opposing forces which he has to go forth and encounter."‡ Again he speaks of "the force reason has to vanquish and beat down all the appetites which oppose the execution of the law."§ Clearly then Kant allows that we must desire, but says we have power to rein in our desires. Hamilton is just as clear. He speaks of man's liberty as "capable of carrying that Law" of Duty "into effect, in opposition to the solicitations, the impulsions of his material nature."|| A few lines lower he speaks of Liberty as a power "capable of resisting and conquering the counter-action of our animal nature."|| Thus Kant and Hamilton admit that we are compelled to desire, but they assert that our free-will can restrain desire. Mr. Spencer must therefore stand convicted, either of being ignorant of what they held, or else of a deliberate misrepresentation of the question at issue. On either supposition he stands convicted of glaring misrepresentation.

2. In the next sentence—sentence four—there is a fallacy. Let it be remembered that Mr. Spencer has to *prove* that the will is not free, and he is now advancing arguments which are supposed to prove it. This is his argument. "From the universal law that, other things equal, the cohesion of psychical states is proportionate to the frequency with which

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* *Principles of Psychology*, vol. i. pp. 500, 503.

† Kant, *Metaphysics of Ethics*, Calderwood's ed., p. 174. ‡ *Ibid.* p. 194.

§ *Ibid.* p. 198. || Hamilton, *Lectures on Metaphysics*, vol. i. 4th ed., p. 29.

they have followed each other in experience, it is an inevitable corollary that all actions whatever must be determined by those psychical connexions which experience has generated." Now what, I ask, is the argument in this sentence save an assumption of the very point at issue?

It is contended, as Mr. Spencer surely knows, by those who hold the Freedom of the Will, that, be the connexion of psychical states what it may, be the organisation what it may, there is still, in every sane man, a power of bearing back the force of the organisation, and of going clean contrary to it. Such assert that there is a *free* element in the Will which makes it unlike to, and higher than, anything elsewhere to be found in the whole domain of consciousness. They declare that the chain of causation which obtains even in the majority of our mental operations, does not obtain in the region of the Will, that it stands solitary and unique—the organ of a free and responsible Personality—surrounded by a universe held in the chains of Law. That is the position taken up by the ablest advocates of Freedom. What argument does Mr. Spencer advance against this position? None whatever; he simply assumes that the will is ruled by the same unvarying law, and has the same definite succession of necessary states as those which obtain in other parts of the universe; which is the very thing advocates of its freedom say it has not. Mr. Spencer, therefore, does not meet the issue; he simply evades it. As we saw in our last Paper, he passed *per saltum* from solar rays to mental energies, so here, by a similar unwarranted leap, he passes from the admitted conformity to Law which marks other parts of our organisation to that unique Freedom and power of choice which resides in the Will alone.

3. In the next sentence but one there is the same unwarranted assumption of the very point in dispute. He calls it "an illusion" to think "that at each moment the *ego* is something more than the aggregate of feelings and ideas, actual and nascent, which then exists!" If this is not confounding the phenomena with the substance in which that phenomena inheres, I am at a loss to understand the meaning of language. "The aggregate of feelings and ideas, actual and nascent," means the various tracts which together cover over the whole area of consciousness—they are the various modifications of the substance of mind. Now, does Mr. Spencer, the advocate of Realism, the resolute Iconoclast of all Idealistic theories—does he mean, as he here says, that "the aggregate of feelings and ideas" is all that is in the *ego?* Does he really deny that there is an *ego* distinct from these, a substratum on which they repose?" If so, shade of Berkeley!

how thou art avenged, for thy fiercest assailant is now possessed by a double portion of thy spirit. Evidently Mr. Spencer here commits himself to a theory of the wildest Idealism. He denies the existence of all substance of Mind, and asserts that there are in us only a fleeting succession of transitory states! Just as well he might deny the existence of all substance of matter, and say that matter is nothing more than a bundle of phenomena. John Stuart Mill asserted this, but hitherto Mr. Spencer has been too wise. He can take up this position if he likes, but he will know the fate which in that case awaits him. Elsewhere he has many times said that mind as distinct from all phenomena of Mind is the one existence of whose reality we can be most absolutely certain, "is a truth transcending all others in certainty." * In this sentence, then, are two contradictions. He confounds substance with phenomena, which elsewhere he has carefully distinguished; and he denies, what he has in other places asserted, that Mind, as distinguished from its modifications, exists.

4. In the next sentence but one there is the same assumption. There is not one particle more of reasoning. He simply asserts that "the entire group of psychical states which constituted the antecedent of the action also constituted" (the actor) "himself at that moment—constituted his psychical self, that is, as distinguished from his physical self." Now here is a very clever and plausible sophism. We cannot say point blank that Mr. Spencer's statement is false, but as he means it, it is false. "The entire group of psychical states" may be, perhaps, held to make up a man's "psychical self," if within those "psychical states" that power of free-will which rules them all is included. But Mr. Spencer means by "psychical states" simply states of mind held in the bonds of unvarying law, with all freedom of will shut out. Hence his sentence, reasonably true in sound, is false in meaning, and no fresh argument is adduced. It is one more *petitio principii.*

5. In the very next sentence he makes the same round assertion, advancing no fresh argument.

6. In the next sentence he makes a break as if about to go on a new line of departure, and give us something more worthy of his masterly dialectic. But it is only to continue the same logical vice. He says:—"Either the *ego* which is supposed to determine or will the action is present in con-

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* *Principles of Psychology*, vol. i. p. 209.

sciousness or it is not. If it is not present in consciousness, it is something of which we are unconscious,—something of whose existence we neither have nor can have any evidence. If it is present in consciousness, then, as it is ever present, it can be at each moment nothing else than the state of consciousness, simple or compound, passing at that moment."

Obviously here is again only assertion, and no proof.

7. In the next sentence he makes the same unsupported assertion, saying, "this composite psychical state which excites the action, is at the same time the *ego* which is said to will the action."

8. The next sentence is very suggestive and self-revealing, but it contains only assertion, and no proof. He continues: "Naturally enough, then, the subject of such psychical changes (it is passing strange how, if these psychical changes are the man himself, as we have so often been told, there can be a *subject* of them—subject is what underlies phenomena, and if there are *only* the phenomena, the subject thereof is only a sort of hypostatised zero) the subject of such psychical changes says that he wills the action, since psychically considered he is at that moment" (the same round assertion as before) "nothing more than the composite state of consciousness by which the action is excited." This seems to me to be on the whole one of the most remarkable sentences in the whole compass of Philosophy. The poor "subject" is made to do duty in many aspects. In the first clause he is a being who alone makes possible all the "psychical changes," for a psychical change cannot take place save in a *psyche*, of which it is a change; in the second clause he is alive and active indeed, but under an illusion in thinking he wills the change; in the next clause he is reduced to "nothing more than the composite state of consciousness" by which the change was effected. Mr. Spencer must be pressed indeed for argument before he could put on paper such hollow reasoning.

9. In the next sentence we have the old assertion, but no proof. "But to say that the performance of the action is therefore the result of his free-will is to say that he determines the cohesion of the psychical states which arouse the action—and as these psychical states constitute himself at that moment"—(asserted and not proved once more) "this is to say that these psychical states determine their own cohesions, which is absurd."

10. In the next sentence he says, "their cohesions" (cohesions of these psychical states) "have been determined by experiences." But this is the very statement which the advocates of Freedom deny. They say that the cohesions made

by the Will are undetermined—that all "experiences" are only votes given in favour of a certain course—and that, be the voting what it may, the Will has a casting vote which can set aside any amount opposed to it, and by its simple decree compel the organisation to act as it pleases. To establish his proposition Mr. Spencer is bound to overthrow this doctrine. As we have seen, he has not advanced one real argument; he has only made assertions. The advocates of Freedom can make counter-assertions, and, for all that Mr. Spencer has contributed, the matter stands where it was.

11. In the next sentence there is the same unsupported statement.

12. The next suggests that what he calls the subjective illusion that our will is free is strengthened by an objective illusion, produced by the extreme complexity of the amounts and directions of the motives that urge it, which complexity is such as to make its action incalculable; and he shows that in proportion as material masses are acted upon by many forces do they move in a line which cannot be predicted, and hence they seem to be free. Any trained scientific intellect will, I think, see the worthlessness of this argument. Every mathematician will say in a moment that if a million forces be acting on a body, it will obey the resultant of them all,—and that between this and freedom there is a difference as wide as logical contradictories can make it.

No doubt the flight of a bird through the air seems to be free; but it seems so only to the untrained intelligence, and any one accustomed to the severities of scientific thought sees quite clearly that every movement of its wings is held in the bonds of fixed law as completely as a planet is held in its place in the heavens. Mr. Spencer's is only an *ad captandum* argument; the illusion would impose on no student of science.

13. Mr. Spencer then makes one final effort—a sort of closing charge, intended to sweep all opponents from the field,—he brings out one of his great generalisations, which are, as a rule, so far-reaching in their range and so penetrating and deadly in their sweep. Here, however, his artillery is loaded only with blank cartridge; there is a great appearance, but no force. He says, "To reduce the general question to its simplest form: Psychical changes either conform to law, or they do not. If they do not conform to law, this work, in common with all works on the subject, is sheer nonsense; no science of Psychology is possible. If they do conform to law, there cannot be any such thing as free-will."

This last sentence seems to show in what way Mr. Spencer is misled. He evidently thinks that conforming to law makes free-will impossible. He has that inveterate materialistic bias, often engendered by scientific pursuits, which can only regard "law" as applying to material things—to masses or molecules—and it must have been evident that all through his Theory of the Will he has been thinking only of the currents of nerve-molecules, and has never had in clear vision the immaterial Mind which rides upon them. Thinking only of molecules he cannot see how they can be free; he is compelled, whilst he is in this materialistic vein, to regard the whole man as all made up out of them, and all contained within them; hence he is driven to make these molecules the determining power of each action, and to ignore altogether that immaterial Mind in the man whose existence is one of the structural doctrines of his Philosophy. This Mind may conform to law and yet be free:—the Will, which is one aspect of the Mind, may determine, within certain defined limits, along what lines the molecules shall go; it may make and carry out its decrees as it chooses; it may be free, and yet all the psychical changes will conform to law, a law the Will imposes.

It is easy to prove that there can be no contradiction between conforming to law and freedom. We can form the conception of an agent who is free, and is at the same time morally perfect. No one surely will contend that these are logical contradictories which cannot be combined in one concept (the illustration would hold if we regarded him as diabolically perfect); now this agent is by hypothesis free, and yet it is certain that his very perfection would lead him, with absolute precision, along the lines of that law which laid down the path of moral perfectness. His organisation being perfect would urge him along that path, his will being perfect and free would deliberately approve of the suggestions of the organisation, would accept them, and carry them out.

If we take up for a moment the Theistic position, the point can be more conclusively proved. Let us ask, "Is God free?" If not, then He also is bound in the same miserable chain of Fatalism. If He is free, yet when He gives fullest play to His energies is He not most completely conforming to law—the law of His own holy nature? If, then, the Creator can be free and also conform to law, the combination of the two concepts in one concrete instance is proved to be possible. Why, then, should it not be possible to the creature also? Made in the image of God, is it not probable that some of the Divine Freedom would be given to us? As we seek to train our children to be good and holy by setting them free in due time from the restraints of law, seeking to educate in them a righteous principle which shall make them rule themselves wisely and well, and as we know that their attainment of this principle is worth all the possible slips and mischances they may make in gaining it, so the Divine Father may see that the true valour of righteousness can only be acquired by setting our spirits free, He may see that the advantages so secured far outweigh the disadvantages; He may recoil from having His Throne surrounded by a band of slaves who never had any choice as to whom they would serve; He may prefer the loyalty of free men; and to secure this He may launch out each human spirit on the ocean of life,—supplying abundance of charts and guides,—but casting on each the solemn responsibility of deciding to what port he will steer, what character he will have, what he will regard as the supreme good of his being. For God so to act is to make Life one grand moral test, and, so far we can judge, it is a course eminently worthy of the God of Righteousness.

It must now have been made evident that all through Mr. Spencer's reasoning on the subject of the Will he has got into a shallow vein, and never gets down to the depths which are found in other places of his philosophy. He seems here to have yielded himself to a preconceived notion, to have allowed that notion to rule the entire structure of his thought, and to have laid aside that habit of careful, dispassionate scrutiny which has, for the most part, characterised him. It is difficult to account on any other hypothesis for the utterly superficial character of the thought and argument he has here presented. If we formed our notion of his Philosophy from these few pages, what could we deem him but the very chief of empiricists? What can we gather from these but that our consciousness of Personality is a delusion,—that our *ego* is only a bundle of feelings and ideas,—that mind is only an aspect of matter,—that the logical laws are only registered sensations,—that consciousness is untrustworthy,—that matter is only phenomena,—that there is no rock of truth anywhere,—that we can be certain of nothing,—that we cannot be certain whether we can be certain of nothing,—that the whole universe is a quaking body where appearance is mixed with reality, and it is quite impossible to tell whether there is anything of either? That is the sorry stuff which may fairly be gathered from these unworthy pages. A more thorough-going contradiction to the doctrines which Mr. Spencer has elsewhere, over and over again, proclaimed to be structural and fundamental principles of his Philosophy, it is not easy to conceive. Then this mere surface of argument, which is just like the strange *ego* he has conjured up,—the mere phenomena of thought without one particle of reality behind it,—this poor word-painting, utterly unbecoming a great philosopher, he attempts to keep in countenance by an illustration just as shallow, just as evasive of the point at issue, just as much a piece of mere paint as all that has gone before. No doubt those have something on their side who affirm that Mr. Spencer's whole system is an empiricism. It must be allowed that he has some clay mixed with his iron and his gold. His system is not homogeneous. Still, as Homer sometimes nods, I, for myself, prefer to appeal from Mr. Spencer, seemingly prejudiced, and certainly shallow and inconsistent, to his own deeper and grander self, and to hold that that is the true philosopher who has led us to found on the solid rock of truth, who has proclaimed that the evidence of consciousness transcends all other evidences, that the existence of mind is one of the most certain of truths. It is his masterly demonstration of these important principles which gives him a claim to our reverence and gratitude, and for the sake of these we can pass by his failing here. But the complete failure of a logician of his grasp to render a worthy reason suggests a very decided inference that the truth in the matter is altogether against him, and that even he is not powerful enough to bear back the overwhelming strength which that truth possesses.

In showing, then, that Mr. Spencer has not proved the bondage of the Will we have made another great chasm in his Philosophical system hardly less important than the chasm shown in the former paper to exist. Then it was proved, on Mr. Spencer's own showing, that although he allowed Mind and Matter to be at opposite poles of the universe, having between them a logical chasm which no effort of ours could span, he yet did attempt to pass logically from solar rays to mental operations, and that his whole system fell in utter chaos if this step was impossible. As it was impossible, it was in this way shown that all the Mind in the universe remained, on his system, quite unaccounted for, and that this omission made a yawning gap he could never fill up. We have shown in the present Paper that there is a similar hiatus when he attempts to pass from Intellect to Will. The continuity of his system depends on his showing that Intellect can pass into Will. If the reasoning of the present Paper be just, he has advanced nothing to show this. All the Will in the universe, then, remains on his system unaccounted for. In the next Paper I hope to show that his system is equally destitute of any trace of Conscience. "A System of Philosophy,"—an explanation of all that is in the universe,—which does not account for any of the Mind, any of the Will, any of the Conscience, and yet claims to account for everything, must speedily lose its hold on intelligent men.

And it seems to me that he has gone a long way, quite unintentionally, of course, towards showing that the Will is free. As parts of his Philosophy form our most invulnerable defence against the attacks of Materialists and Idealists, so it may be that he has also supplied some of the most solid arguments for the Freedom of the Will. We have been assured by him that Mind and Matter are at the two opposite poles of being. They are x and y, two existences having no factors in common; no one thing being found in the one which is also found in the other. I understand his rhetoric to mean or to imply that they are logical contradictories, whatever the the one has that the other has not. They form a perfect series of antitheses, and if they are at the opposite poles of being, as he says, I do not see how this conclusion can be avoided. If they have any one element in common, there surely they can unite, and that element makes a bridge over the mighty chasm that divides them. But Mr. Spencer says no such bridge is possible; they are the Jews and Samaritans of the philosophical world, eschewing all intercourse with each other.

Now if this conception be just, as it seems to me it is, surely it must be true that whatever is found in the one will not be found in the other. And beyond all question fixed causation does obtain in the world of Matter. Everything there is held in the iron grip of law. Thus it seems to me that such fixed causation cannot obtain in the realm of Mind, but that, as the logical contradictory of the law obtaining in Matter, the opposite rule, of Freedom, must obtain in the realm of Mind.

It can readily be ascertained whether Mind and Matter are logical contradictories in all other things. Certainly they seem to be. Matter is extended; Mind is unextended. Matter is unintelligent; Mind is intelligent; Matter has space relations and has weight; Mind has no space relations and has no weight. Matter is capable of motion or of transit in space; Mind, having no space relations, is incapable of motion. It seems to me the antitheses might go on *ad infinitum*. If, then, in every other conceivable category of thought Mind were the proved antithesis of Matter, that doctrine would have but a very precarious hold on a strong intelligence which asserted that in this one instance, viz., of bondage to fixed law, Mind and Matter were alike. One frail spider's web spanning the almost infinite chasm between Matter and

Mind—the frowning cliffs rising high on each side, needing the vision of an archangel to survey them, confronting each other in solemn isolation, and this one frail link alone binding them! the idea well-nigh becomes incredible. If separated, as Mr. Spencer assures us, they are completely separated, they must be logical contradictories with no bond of union.

This philosophical doctrine of the Freedom of the Will does not seem to me to be defended by the upholders of Revelation and of the Moral Law with anything approaching the zeal and fidelity that the magnitude of the matter demands. Kant may be said to have put forth the undivided energy of his keen and powerful intellect in order to establish the thesis of the Freedom or Autocraty of man's will, and to show that the whole Moral Law must stand or fall with it. He in effect binds up the two doctrines into one, and not unfrequently makes them synonymous. Thus he says, "We have now reduced the Idea of Morality to that of Freedom of Will."* Again, he says, "Autonomy of Will is the alone foundation of Morality."† and many other distinct statements, as well as the whole structure of the *Metaphysics of Ethics* go to show that, in his judgment, to deny Freedom to the Will was to make the idea of Morality impossible. He seems to me—and it is a growing opinion in our day—to have been one of those rare prophetic minds, ranking amongst the great men of all time who stand forth as the champions of eternal truth, whose glance sweeps down the centuries, and whose judgments express the thought of the All-wise God. Doubtless in his critical Philosophy Kant was mainly destructive, but in those of his works which are thrown up as bulwarks of the Moral Law, he seems to me to display a penetration and a power far beyond any mind of later times. No modest man can, I think, pit his judgment against Kant. Hamilton followed in his footsteps largely as his disciple, and he makes the same impressive declaration that Moral Liberty and Moral Obligation must stand or fall together. He says, "Virtue involves Liberty;"‡ he says, "The possibility of Morality depends on the possibility of Liberty; for if man be not a free agent he is not the author of his actions, and has, therefore, no responsibility,—no moral personality at all."§ In addition to these solemn and weighty statements it is clear that he determined to found his whole metaphysical system on the moral canons, and that notable and noble parts of it are chiefly intellectual buttresses, thrown up to keep safe and intact the outworks of the Moral Law. He has examined all the intellectual antinomies, which Kant raised, but never solved,—he has combined them all in one conception, magnificent in its sweep, startling in its originality—the "Law of the Conditioned"—and any one who accepts that law has provided for him a fortress of incalculable strength, within which the doctrines of moral liberty and moral obligation may be defended against all assailants. John Stuart Mill attacked that "Law of the Conditioned" in what may honestly be described as a ferocious style, for he saw how invincible it made the Theistic position; but his poor little sophisms are now treated with the contempt they deserve. Mr. Spencer can be shown to have accepted as valid the main arguments which lead up to the "Law of the Conditioned," and it needs nothing more than a slight resetting of the Hamiltonian thesis in order to make it invincible against all attacks.

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* *Metaphysics of Ethics*, Calderwood's ed., p. 59.
† *Ibid.* p. 99.
‡ Hamilton, *Lectures on Metaphysics*, vol. i. p. 27, 4th ed.
§ *Ibid.* p. 33.

Kant and Hamilton are by this time almost proved to be of the prophetic order of men, for what they asserted to be a logical necessity has now actually come to pass. We just saw that they declared moral liberty and moral obligation to be indissolubly united, and that the denial to man of liberty must lead to the denial to him of moral obligation. Mr. Spencer's whole Philosophy is a startling commentary on this thesis; he denies liberty to man, and there is in his system no trace of moral obligation. He has lately proclaimed that the "sense of duty or moral obligation is transitory,"* and that as civilisation progresses, man's nature will become more perfectly co-ordinated, needing no moral directions. No one who watches the currents of thought in our day which deny to man Freedom of Will can question that denial of moral obligation accompanies them to no small extent. The advocates of Determinism and Automatism can see instinctively that our moral instincts are opposed to them, and that if these instincts remain in full force their theories cannot prevail; as the doctrine of their school sinks into Materialism, its antagonism to all moral principle, all sense of right, all authority of conscience, is at once more constant and more vehement; and in the lowest stages it reaches a point where man is made to be only a helpless mechanism, all future retribution is derided as an old world dream, and the worst impulses of his sensual nature are unblushingly defended. Thus, surveying the matter along the whole line, from the noble utterances of men like Kant, to the refined yet negative morality of Mr. Spencer, and still on to men infinitely beneath him, mere human animals, who glory in their shame, the same truth meets us, that the denial to man of moral liberty—of perfect freedom to choose or reject either good or evil—leads, of necessity, to the denial to him of moral obligation. Put upon him at once the honour and the responsibility given him by his Creator; then he must live like an immortal being, or be condemned by his conscience if he does not. Take from him this crown, he soon descends, and, in inferior natures, begins to wallow without blushing in the mire.

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* Spencer, *Data of Ethics*, p. 127.

It may be well to remark that the philosophical doctrine of the Freedom of the Will by no means necessitates that heresy of Pelagianism, branded as false by the Universal Church, which teaches that man, by his own inherent strength of Will, without the aid of Divine grace, can arise and work out his own salvation. No man was more diametrically opposed to this heresy than Augustine, no man was its more uncompromising antagonist, yet he himself held the philosophical doctrine of the Freedom of the Will. He says: "For who is there of us would say that by the sin of the first man free-will is utterly perished from mankind?" * Archbishop Usher, again, was one of the stanchest upholders of the need man has of converting and renewing grace, yet he was a resolute champion of the Freedom of the Will. He says: "Freedom of Will we know doth as essentially belong unto a man as reason itself; and he that spoileth him of that power doth in effect make him a very beast." † We may hold that men are morally free, that they are the fashioners of their own moral character and the arbiters of their own destiny, and yet have the most profound sense that until a power comes into them from above, and supplements their feeble efforts by the flood-tide of a Divine energy, they never can arise and work out a righteous character. Where to draw the exact line between the Divine and the human working it may be hard to say, and, as it is of no practical importance, perhaps it is not well to attempt it. It is sufficient that we remain within the broad lines upon which the Church Universal is practically unanimous, of the absolute need of the entrance into man of a Divine Spirit, who can refine and purify his Will, cleanse it from all earthly defilement, and lift it high into the regions of

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* "Quis autem nostrum dicat, quod priori hominis peccato perierit liberum arbitrium de humano genere?" *Cont. Pelag.* lib. i. cap. 2.

† Usher, *Answer to a Jesuit on Free-Will*, 445 (Cambridge ed. 1835).

God's holiness, where it can still stretch onward to the moral infinity that then comes into view. This doctrine of the helplessness of man, and his need of Divine grace, by no means conflicts with the doctrine of the Freedom of his Will. Some of the Scotch theologians have, I think, confounded unjustly man's need of grace with the doctrines of philosophical necessity. To my mind the two are in entirely different regions. Man is free to take his own course, but, if he proudly rejects the help God offers him, he will find that all schemes of his own are unavailing, and that his weak arm cannot bear back the forces which urge him in a downward direction.

Let us, then, understand that in this question of the Freedom or the reverse of the Will we are dealing with a matter of the greatest moral moment. If the will be free, then the moral nature of man at once comes into prominence; the conscience is seen to be seated on the throne; the awful moral sanctities are clearly revealed; the infinity of all questions connected with righteousness is made evident; the horizon which bounds our existence recedes before us, and we find ourselves placed as actors on the vast stage of the universe, furnished with helps and guides, but bidden to choose our own destiny, to take upon ourselves the solemn burdens of existence, and to say whether our path through life shall be, first, the battle-field of a hero, then the exultation of a conqueror, then the aspirations and holiness of a saint, and shall finally carry us throned and triumphant to our coronation amidst the saints of God; or whether that life-path shall be a misuse of opportunities, a despising of offered help, a mocking at the restraints of law, an intellectual selfishness, a gradual debasement, a final sinking into crimes for which no name can be found. Upwards or downwards man must go, and there seems an infinity in both directions. It behoves us all to choose the upward and happier path, knowing that we are quickly advancing to the last tribunal, where the secret action of every Will will be laid open, and all will be tried by just and universal Law.

The CHAIRMAN (Rev. Preb. Row, M.A.).—On the part of the meeting I have now to propose a vote of thanks to the author of this paper, a vote which I feel sure we shall all very cordially tender for the extremely clear, distinct, and effective manner in which he has met the entire question. (Hear.) Before sitting down I wish to make a few remarks, as I shall not be able to remain until the end of the meeting, this being the first evening during the last two years upon which I have ventured out of doors. I think the paper throughout is exceedingly clear, and that it has ably met the position assumed by Mr. Herbert Spencer. One thing which greatly surprises me is, that books like those of Mr. Spencer—so utterly contradictory to common sense, and to the very first intuitions of our nature—should have obtained the wide circulation which they have among a large circle, including many of the most powerful minds of our age. I have no hesitation in saying that the subject handled in this paper is the very central one of the present system of practical atheism. The great and all-important controversy at the present day centres around the efforts which a number of powerful intellects are making to confound between the material and the moral; and if it could possibly be established that this confusion does exist, and that the material dominates from one end of God's universe to the other, then the paper abundantly shows that there is an end of all morality; for unless the innermost intuitions of the mind are true when they tell us that if we are not free to do this or that, we can have no possible responsibility for the acts we do. (Hear.) It comes, therefore, to this, that the controversy lies very much within the limits of common sense. To tell me that for the evil I do I am not responsible, is in reality asking me not to see that gaslight now before me, when I am seeing it as plainly as possible. What gives a degree of plausibility to these speculations is the frequent use of a great number of hard words: the tendency to do this runs throughout the works of the whole of this class of writers. The number of these hard words is so great that I find my own intellect somewhat confused when endeavouring to read them, and I think that if the authors I refer to would only write in plainer English, their systems would very soon be absolutely exploded. When we are asked to believe that our personality is nothing but a mere succession of feelings, what is it that we are asked to accept? Why, something which entirely contradicts the whole testimony of the human race from the moment man appeared as man to the present hour. Those who maintain this view cannot express themselves in language without distinctly denying the theories they expound. This shows that there is something singularly absurd in the position they take. We have no certitude more certain than the permanency of the *ego*. To suppose that the whole experience of man from the commencement, both objectively and subjectively, is based on a simple delusion, would denote an amount of credulity exceeding anything that I can possibly conceive. But this is the result of the theories in question, notwithstanding the great names attached to them, that if they are accepted by the large body of mankind they will certainly end in subverting all sense of human responsibility. Evil then becomes merely a man's misfortune, not his sin; and crime, insanity; and the result will be that the sane portion of mankind will have to build a large number of asylums in which to place one-half of their fellows, so as to save themselves from possible dangers. There is only one other point upon which I would touch—I am bound to say that I cannot agree with the position which has been laid down to the effect that we can be philosophically free and at the same time theologically bound by necessity. I think that the position is hopelessly unmaintainable, that a thing can be theologically true, and philosophi callyfalse, or the converse. I do not care for any abstract theories. I say freedom is a fact—one of which we are directly conscious, and therefore one of our highest certitudes; and therefore, I hold, it is a great error to say we can be philosophically free in one sense and theologically not so in another; and although some great names may be mentioned in support of the proposition, my reply is that I do not care whose doctrine it is, it is certainly not the doctrine either of reason or of the New Testament. (Applause.)

Rev. J. FISHER, D.D.—According to the paper, at page 110, we are told that "mind and matter are at the two opposite poles of being"; but that the author only means that they are objective and subjective sides of the same substance; at any rate, it comes to that in the end. Two pages further on he says that Mr. Spencer denies liberty to man, and asserts that moral law must fade away out of the earth, and man will need no moral directions. In that case, of course, we must have the golden age.

The CHAIRMAN.—This is assumed in his last work.

Dr. FISHER.—On page 101 Mr. Spencer is quoted as saying,—"that the *ego* is something more than the aggregate of feelings and ideas" is an "illusion," and in the next sentence he speaks of man as subject to "psychical states!" On the next page we find Mr. Spencer quoted as speaking on the subject of "psychical changes"; but surely if man, the *ego*, and the psychical states and changes, be the same things, where is the subject? There is none. Mr. Spencer writes thus confusedly because he is a monist, using the language of a dualist. Monism cannot construct a language for itself. As regards freedom of the will, natural freedom is a ground of responsibility, and grace does not interfere with it. The will is the power of mind by which we choose aright; but the exercise of the will is from the heart, and, as the heart. Will is the medium of active power, and operates according to the nature of the agent, and the nature of the agent is the source of power. What is needed to a good choice is an influence from God in the heart. A self-determining will is an absurdity, for if the will move itself it is both cause and effect. Motive determines the will. The motive determining the will has a place in the understanding, and it is through the understanding, which is the key to the heart, that the will is moved.

Rev. Preb. IRONS, D.D.—I think the paper which has just been read is a very important one, and it is none the less so for the statement it contains, that this is *the* question of the age, and one which we as Christians have not, as yet, sufficiently attended to. (Hear.) There is no doubt that St. Augustine contributed to the stream of Christian thought, and it has scarcely settled down into a clear and healthy condition from his day to ours. There is truth in the statement of the essayist, that the Scotch philosophers, who have a great deal to answer for in the matter, were so much afraid of the doctrine of free-will, that they absolutely practically denied it in the whole region, both of ethics and religion. I wholly deny that the grace which comes from God to assist the efforts of imperfect man, at all destroys human will. (Hear.) That it interferes with it I will admit, in some sense, as a matter of course. Why, otherwise, should it come at all? But if it gives a man clearer knowledge, stronger powers, higher aspirations, that man is responsible for all he has so acquired. The doctrine of responsibility is grounded in our sense of retribution for all wrong that is done. I will grant very freely with all thankfulness to God, that in connexion with this doctrine of retribution, there is a sense that mediation between us and the judgment that is due to us is quite possible. A man does a wrong thing and fears the wrong he has done, but, at the same time, no man has put himself in this position without also having the feeling, that in some way or other some one will interfere. This interference we have, as Christians, in the mediation of Christ. However, leaving this question of Calvinism and freedom of will and sense of retribution, and hope of mediation and intervention, I should like to go back for one moment to the beginning of the paper, and I promise that I will not detain you more than a minute or two. It is a matter of common sense that the *ego* precedes every action of every kind performed by a human being. Action is not possible until there is an *ego* to act; and here we see the very blunder which pervades Mr. Herbert Spencer's philosophy. One is astounded to find that the same blunder has penetrated the whole of the materialistic mind of our age. They leave out the thought of this *ego*, which we are very properly told by Mr. Spencer goes before the action. But he afterwards tells us this *ego* is the result, or is identical with the circumstances in which we find ourselves—the feelings which arise within us. He quite forgets that if there are feelings there must be an *ego* to feel. Whose feelings are they? They are the feelings of the *ego*—of the man. And this leads me to object in the strongest way to the manner in which Mr. Herbert Spencer, and almost all of us, are in the habit of using popular abstract terms as though they were entities. Men say they are moved by motives. I may contemplate a certain thing and may consider it; but the motive does not move me. It is I who move in the whole matter. Men speak of their having a memory. I have not one. I am thankful to say, I remember. (Hear, hear.) I have legs, but I should not say they consist of walking and running: the walking and running are actions of the limbs set in motion by the *ego*. In every way we are injuring ourselves by abstract ideas. I do not deny that they are of great usefulness; as Berkeley pointed out, as instruments of thought they are absolutely necessary. Some of them are but collective terms. When we speak of a man, we use a word which is a general term, to describe what we mean, whether a white, a red, or a black man. It is a general term to describe the object we have in view. Every one knows what I mean in a general way, if I say, "as I came to this room to-night I met a man." You would not say I was speaking incorrectly if I did not describe how tall he was, nor how he was dressed, nor what nation he was of, whether, for instance, he was a Frenchman or a Dutchman. These general abstract terms are both useful and necessary for the common purposes of the language. There is also a higher type of abstract words, and it is needless to pretend that these abstract ideas are entities existing apart from us, when they are the descriptions of those actions which we ourselves perform, and not our wills, our memories, or our reflections. *I* will; *I* remember; *I* reflect; but do not tell me that I use my memory; that makes a third party. I am not conscious of anything of the kind, nor do I believe that anybody in this room is. I know that some gentlemen, and, I may say, some ladies, have very strong wills. (Laughter.) But that means simply that they can will very strongly, and no one can mix in the society of either sex without finding that the individual can will. But to take it for granted that he has something in addition to himself which does the business of willing, is to me wholly unphilosophical; and this, to my mind, is the prevailing blunder of Mr. Herbert Spencer, *et hoc genus omne.* (Applause.)

The CHAIRMAN.—There is no doubt that much confusion is caused by people saying that by freedom of will it is meant that a human being can do anything he pleases. I will only say in reference to what has been said by Dr. Irons, the great Truth was known in the days of Abraham, "Shall not the judge of all the earth do right?"

Professor O'DELL.—I fully appreciate the manner in which Mr. Ground has, throughout his paper, kept to the subject under discussion, and kept clear of theological matter. Mr. Herbert Spencer has challenged us in regard to the question of the will, and on reading his works, the conclusion I have come to from time to time is that his statements are very much opposed to our universal experience, especially in regard to the subject before us to-night. If we appeal to our experience concerning the will, I think we shall be able to obtain more truthful information than we can derive from what has been written by Mr. Herbert Spencer. In considering the question, "Is the will free?" let us ask ourselves—can we go to the right or to the left? Can we live or die? I can do any or either of these things. I can, if I choose to do so, act in opposition to my own intelligence, which tells me certain things, and that one course is wise and another foolish. We all know that we can go directly contrary to that which we believe to be right, and we know also that highly intelligent and cultured men have acted in opposition to their own reason. There have been men who have been educated in the highest colleges, who have acted in the basest manner, thus showing that they had wills which could deprave them to the lowest depths in direct negation of all the culture they had received. On the other hand, we are also aware that there have been men reared in the lowest haunts of vice and misery, who have shown their freedom of will in an entirely different direction. Quite independently of the teaching they have had, they have exercised their wills in opposition to all evil influences. Again, we have the fact that there are men who will not allow their wills to be bound by laws, as Mr. Herbert Spencer must at least acknowledge,—men who refuse to obey the laws of their country, laws the breaking of which brings immediate punishment upon them, and in doing this they act in opposition to their judgment and to every good influence brought to bear upon them. Moreover, I would say it is not only in opposition to reason and reflection, and to the laws of the country, and without any sufficient inducement, but men are also known to assert their wills in opposition to the laws of God, which they acknowledge and believe to be right and true. Men having full belief in the pains and rewards of eternity, have, nevertheless, gone in entire opposition to that belief, thereby proving that, universally, the will is absolutely free. (Hear.) Mr. Herbert Spencer is spoken of as a man of philosophic grasp and of clear scientific conception. All I wish to say is this, that if I were to take Mr. Herbert Spencer's assertions as entitled to my fullest credence, I could not believe in Christianity—in other words, I hold that it requires more faith to believe in Mr. Herbert Spencer, than to believe in Christianity.

Mr. W. Griffith.—I think we are very much indebted to the author of the paper for having proved false or erroneous some of the arguments of Mr. Herbert Spencer. We need not refer to the Spencerian theory to understand the necessarian view. Whoever will look into the works of Hume and Priestley will fully understand that line of thought. They asserted that the connexion between motive and action is similar to that of cause and effect in physics ; that human actions are the result, not of choice, and that they are the sequences of physical causes, not the consequences of deliberate reason. Even those who in theory contend for the doctrine of necessity, in practice ignore it. Was Mr. Herbert Spencer a mere automaton when reading previous philosophical authors ? Did he exercise no deliberation when he composed his essays ? And when he had selected a publisher to print and circulate his opinions, were each and all of these processes the mere result of a fortuitous concurrence of material atoms ?

If we rightly define the word law, we shall be able to understand all the fallacies which pervade the arguments of Mr. Spencer, and which have been refuted by the author of this paper. Then it will not be requisite to follow those arguments *seriatim.* How do we define what we mean by the word "law"? Is it a mere sequence of effect ? Is that a true proposition ? Surely not. There are laws physical and laws moral. The former must take effect ; the latter ought to be obeyed. The latter, when defined according to the nature of things, suppose disobedience possible, and postulate the freedom of the will. Most sound writers on morals and jurisprudence will tell you that law is the expression of the will of the law-giver enforced, by some sanction, upon the moral being. If you once admit this definition of law the whole scheme of Spencer fails to the ground, and needs no further exertion to destroy it. But destruction is not construction. It is easy to criticise and find fault with anything ; but we ought to consider what we shall substitute in its place.

We have to establish, as a matter of fact, that the will is free. The mere destruction of Mr. Spencer's theory by Mr. Ground hardly establishes the positive side of the question. Dr. Irons appealed with great force to the feelings of the human mind, and, undoubtedly, there is a great deal in what he said. That is one argument in support of freedom of the will. But there are others. We may say, for instance, that every language proceeds on the supposition of the freedom of the will. How do you explain those words in the English language which are used to signify determination, choice, or judgment, without supposing freedom o choice and ability to judge and determine? And if we turn to other languages we shall find that it is the same in the French, German, Greek, or Hebrew, as it is with us. In fact, the whole consensus of States and peoples, who have and do use language, supports the conclusion that language supposes freedom of will. Again, to appeal to other facts—I do not wish to enter on the theological arguments founded upon prayer and praying to the Supreme Being, because we are discussing the more scientific aspect of the question, and it is well to lay aside for a moment the theological—but, when we wish to influence an angry man, do we not entreat him? When a father wishes to persuade his child, does he not use the arguments of persuasion, and does he not, in following such a course, presuppose freedom of will in the child he seeks to persuade? Again, in politics also, what do we mean by a petition or prayer to Parliament? Is not that a process intended to influence the intelligence of the representatives of the nation? And what is meant by sending those representatives to Parliament, but that they are to exercise their intelligence and their wills for the benefit of the nation?

Mr. Herbert Spencer has advanced somewhat beyond Mr. Hume and Mr. Priestley. He has, with great plausibility, told us that there are certain nerve-currents, and that these are evidenced in what he calls nervous energy and force. This is perfectly true: there is, doubtless, such a thing as nervous energy, and such a thing as force, which are exhibited in the raising of the hand, the movement of the foot, or in any action of the body. In all this he has surpassed Hume and Priestley, but after all he has not established anything as to this nervous energy which Dr. Carpenter and other physiologists had not taught. (Hear, hear.) To support his other and more dangerous tenets he has appealed in terms of some eloquence to the consciousness of each individual. But individuals differ and disagree. Whose consciousness shall we take? Our own is preferable to that of another man's, especially when, like Mr. Spencer, he lowers us in the scale of moral beings. But the question being as to the nature of men in general, must be determined by the voice of preponderating testimony. But how, it may be asked, are the suffrages to be collected? In every civilised nation the induction has been already made, the suffrages taken; the case has been tried, and the decision is on record; the verdict has been given without reference to the controversy in dispute.

What, let me ask, is the object of Parliament in making a law? What is in the mind of the Legislature when it passes a law for the benefit of the nation at large? Does it not forbid, condemn, and impose a punishment for the transgression of that law, on the supposition that men and women, as a rule, individually possess self-control and the power of choosing the good and rejecting the evil? Being a practising barrister, I know, we all know, what is frequently put forward as the defence of those who have broken the law. When a criminal is put on his trial for a particular offence, how often does he plead that he has committed it by accident or mistake or unintentionally,—that he had no guilty mind. And the defence of accident is admitted. For instance, if a person, while defending his house against a robber, shoots his own servant when he intends to shoot the burglar, he is held not to be guilty of murder. He exercises his will in shooting, but there is no vice in what he does. In doing what he had a legal right to do he has unwittingly done what he did not mean to do. There is a defect in the use of the will. Then, if you take the case of an infant; he may be put on his trial, but unless the understanding has been developed, "he," says the law, "ought to be, as a matter of course, acquitted; because he is not held to be responsible until he has reached years of discretion." Again, take the case of a lunatic; he is acquitted on its being shown that there is a defect of the understanding, and that he is not able rightly to exercise the will. It is there held that there is no moral, or at least no legal, vice in the will. All these instances go to prove that the administration of the law proceeds on the supposition that there is freedom of the will, and that the accused is punishable for its improper exercise. Again, we must recollect that this is not merely the state of the law in England. The French laws proceed on the same line; so also do those of Germany and other European states. In fact, the testimony of the whole civilised world shows that the freedom of the will is looked upon as essential to guilt, and no one is punished unless that freedom exists. I will but mention the testimony of conscience, and the evidence derived from that. If we look to ourselves and remember what have been our own failings in the past experiences of our lives, we shall, as individuals, admit at once that we have had freedom to choose the right and avoid the wrong. Passing to the second part of the subject, I must say that to some extent I agree with Dr. Irons in his criticisms on the statements that have been made respecting the theological and moral view of freedom of will. I think it has been conclusively proved, not only that the theory of Mr. Herbert Spencer is unstable, but also, as a matter of fact, that freedom of will does exist, although it is true that great writers, such as Augustine, have taken up the theological question, and have somewhat obscured the doctrines of Christianity thereby. But Augustine was not consistent. I think Mr. Ground is correct in saying that Augustine asked how can there be guilt if there is no freedom of the will? But at another period of his life he wrote as if he looked on grace as irresistible, and held that freedom of the will did not exist. But the question is, What is Christianity? and not, What were the views of St. Augustine? We can recur to the original record, and we find St. Paul asserts not only the supremacy of Divine grace, but also the freedom of the will. He tells us in the Epistle to the Philippians, ii. 12 and 13, that we are to "work out our own salvation," and at the same time he says:—"It is God which worketh in you, both to will and to do of His good pleasure." This single text illustrates in a remarkable way the complex problem that may be raised as to the operations of the grace of God and the freedom of the will at the same time. (Applause.)

Mr. J. Enmore Jones.—It seems to me that Mr. Herbert Spencer has in his mind only two facts—psychical and physical,—and that his argument is grounded simply on these, which, in theological terms, we call the soul and the body. He seems to have lost sight of one other element. Most, if not all of us are often conscious of impulses and strength not our own, and we come as Christians to the contemplation of the three great powers we are told of by the Apostle—body, soul, and spirit,—it appears to me that this third power is a power which is not recognised by Mr. Herbert Spencer. I think that if this power were better defined, we should get rid of a great deal of the difficulty which has hitherto helped to obscure the matter. I have referred to this fact, so as to point out what I think has been very much overlooked, namely, that this power which we call spirit, has been especially created in us by the Deity and connected with the two other powers—the soul and body. The soul is, as Mr. Herbert Spencer says, attached to the body, and intermingles and works with it in a mysterious way; but I say that these two are acted upon so as to produce visible effect, by the spirit, which Mr. Herbert Spencer has not alluded to.

Rev. F. N. Oxenham.—I suppose it will be admitted that in examining any philosophical problem, if we are in search of the truth, we ought not to allow any weight to supposed consequences. I mean that we should not permit ourselves to be at all influenced towards rejecting or towards accepting any theory, because it involves, or appears to involve, some consequence which we object to, or which we welcome. This, I suppose, we should all admit as a general rule. But, on the other hand, if a theory is put before us which obviously carries with it the negation of any well-known and indisputable truth, then we are justified in saying, "inasmuch as this theory necessarily involves the denial of what we know to be true, we do not care any further to inquire into it. It contradicts what is certainly true, and therefore it must be false." Consequently, when we come across a theory which is admitted to be contradicted by the evidence, not of one language only, but of all languages, by the accordant evidence of all mankind in every country and of every age, by the establishment of every civilised government ever known (for all governments are constructed on the theory that man is a responsible being, and *can* do, or abstain from doing such things as are enjoined, or forbidden: the belief that this is so is evidenced by every law that was ever made),—when, I say, we come across a theory thus irreconcilably at variance with the universal testimony of mankind, we cannot justly be accused of prejudice if we put it aside, saying that we do not care to inquire into it. It is obviously false, being at variance with an undenied and undeniable truth. Now it seems to me that the tendency of Mr. Herbert Spencer's argument is not to disprove the freedom of the will, but simply to ignore that there is such a thing as will at all. He is really arguing for the thesis, that our *desires* are not free; and in showing this, he appears to think that he has shown that our *will* is not free. Our desires, he asserts, are the joint result of impulses over which we have little or no command. He brings much evidence to show the truth of this thesis, which we have no desire to question; and then, having proved this, he imagines that he has disposed of what he calls "the dogma of free-will." "*The real proposition,*" he says, "*involved in the dogma of free-will is, that every one is at liberty to desire or not to desire.*" This is a complete misconception. The question is not whether we are free to desire or not to desire, but whether we are free to follow our desires or not to follow them. Mr. Spencer's assumption that will is nothing more than the result of those forces which produce natural desire, is an assumption not only without evidence to support it, but in the teeth of evidence which denies it. I cannot *desire* to be hanged, or shot, or suffocated, or to undergo any great pain; but I can *will*, I can *choose* to undergo any of these things. My desire to do a thing or not to do it, may be, I admit, simply an effort of nature beyond my control, the result of the joint action of various involuntary impulses, as Mr. Herbert Spencer has very clearly defined it. We do not quarrel with him for saying that our *desires* are the mere outcome of these natural impulses; but we do quarrel with him for assuming that our *will* has the same origin and nothing more. And when he jumps to the conclusion that the will is not free *because* the natural desires are not free, we are compelled to pull him up, and to protest that such a conclusion is wholly unwarrantable. It is, in short, simply ignoring that there is any such thing as will. I shall not, however, dwell farther on this, as Dr. Irons has already so clearly reminded us what is the true character of the will as one most important element in the *ego*: but I wished to call attention to the fact that Mr. Spencer is not really *arguing* against the freedom of the *will;* he is arguing against the freedom of the *desires*, and then *assuming* that the freedom of the will is by the same arguments disproved. (Applause.)

Rev. C. L. Engström.—Thirteen or fourteen years ago, when I was reading the Duke of Argyll's book, *The Reign of Law* I saw what every one must see who gives the subject sufficient consideration, that the mind is subject to law as well as the body, and I think that unless we grasp this thought we cannot understand Mr. Herbert Spencer's argument. Further, we are wrong, I think, if we regard the (free) will as a separate originating force; the mistake seems to arise from the use of the word will in two entirely different senses. A *strong will* really indicates a strong mental nature, especially in regard to the desires, but *free will* is the ability to choose which of two or more existing forces shall come into operation. A strong will is a magnificent force directed by free will for good or for evil. The responsibility rests with the free will, though the strong will, which is merely an instrument in its hands, gets the blame when it is misdirected. But not to dwell overmuch on this magnificent, but subject force, we ought, as it seems to me, to hold that above the body and the mind, which consist, according to the best philosophers, of three departments—feelings, ideas, and desires—there reigns supreme a thing called the (free) will, and that that free will has the power in the case of every human being of *directing* actual forces, whether physical or psychical. It is a directing power and not a creative power—resembling the pointsman, who sees a railway engine hurrying along a line, and by the simple movement of a lever, gives it that direction which secures the safety of the train. And so all through the life of the human being this will of ours (most free, when voluntarily subordinating itself to the higher Will of the Creator) directs our course for good or evil, it being in accordance with the way in which the will operates within us that we become good or bad. From the earliest moment of conscious choice we are admitting or excluding, fostering or destroying, good feelings or bad feelings, good ideas or bad ideas, good desires or bad desires, and side by side exalting or depressing the higher (psychical) or the lower (physical) natures, and in the case of a Christian welcoming or driving away the Holy Spirit of God, or the arch enemy. Thus from moment to moment we are weaving into that nature and character, with which we started on our course, new threads, and thus we by free will change the stream of our tendencies, and become what we are—heavenly, Christian, godlike, or earthly, sensual, devilish. (Hear.)

Rev. W. D. GROUND.—I thank you all very much for the kind attention you have given to my paper. When I see the notes of this discussion, I shall think them over and add what I may deem it best to say. But let us all clearly understand that in this matter, although we need not accept the philosophical doctrine of necessarianism, we ought, as devout Christians, to accept the great doctrine of grace. I think the remarks made by Mr. Enmore Jones may help us at least to an illustration of the matter. He spoke of the inspiration,—I cannot call it anything else,—which occasionally comes upon us. Now it seems to me that, in much the same way, a power which we receive from above appears to come behind the will, when we have placed the will in a right direction, which power acts like a breath or *afflatus*, bearing us on towards divine thoughts and desires. This seems to me the action of divine grace. But at the same time I think that the assertion of man's need of such grace is consistent with the maintenance to the fullest extent of the philosophical doctrine of the freedom of the will; and that it is impossible to deny this freedom of the will, and yet to defend successfully man's moral responsibility. This is the great citadel we must maintain at all cost. We must say that the sense implanted within us, which tells us we are free and uncontrolled, is the deepest and truest part of our being, and nothing else must be allowed to usurp its place. No doubt there are intellectual difficulties in holding the theory of moral liberty. For myself I accept heartily Hamilton's "Law of the Conditioned," which, I hold, sweeps away all the difficulties, establishes reason on a rock which cannot be shaken, and provides an impregnable fortress for all the doctrines which contain the philosophy of moral obligation. (Applause.)

The meeting was then adjourned.

REMARKS BY THE RIGHT HON. THE LORD O'NEILL.

I look upon both this and the former paper contributed by Mr. Ground as very valuable contributions to the literature of the Victoria Institute. In the present one he seems to me to have quite correctly pointed out the fallacy which pervades Mr. Herbert Spencer's system of psychology, namely, his making the *ego* to be nothing but the aggregate of feelings and ideas, existing at each moment. Where or in what such ideas and feelings exist, is a question to which Mr. Spencer does not supply us with a satisfactory answer. He does not, of course, mean all ideas and feelings throughout the universe, inasmuch as these consist of innumerable aggregates; and if he means those belonging to any one person, he is not consistent with himself, inasmuch as, on his theory, there is no such thing as personality in any intelligible sense of the word. His view would destroy the *ego* altogether. For who can guarantee that the aggregate of ideas and feelings at any one moment will be the same as at another? In fact, this aggregate is ever-varying. I may be thinking of one subject at one moment and of another at another. I may be glad now, and sorry a few moments hence. In short, my state,—*i.e.*, the aggregate of my ideas and feelings,—may at any instant be quite different, nay, opposite, to what it was at the instant immediately preceding. Indeed, it is scarcely possible, on Mr. Spencer's principles, to express oneself correctly on this subject. For when I say, "I may be glad or sorry," or when I speak of the aggregate of *my* feelings, &c., an *ego* distinct from those ideas and feelings is necessarily implied; nor could I express my meaning intelligibly without implying it. Mr. Spencer himself, as Mr. Ground has observed, although his language is most carefully chosen, cannot help, in one passage, speaking of "*the subject* of such psychical changes," &c., although he does not admit that there is any subject in which such changes could take place. In short, with all his ingenuity, he cannot get over the fact that feeling cannot take place unless there be something which feels, nor can thought be exercised unless there be something which thinks. As well might we assert that there may be motion without anything moving or being moved. Thus ideas and feelings necessarily imply an *ego* which perceives and feels, and which, at the same time, is distinct from perception and feeling, as being the subject of which these are states or accidents. Well may Mr. Ground say that the fiercest assailant of Berkeley appears here possessed of a double portion of his spirit. In fact, in asserting that the *ego* is but an aggregate of ideas and feelings, he goes as far as Hume, who did much to explode Berkeley's views (though such was not his intention) by showing the consequences to which they lead, when logically carried out. Berkeley held that the only realities are Mind and Ideas, the former being the vehicle of the latter. Hume saw no necessity for the vehicle, considering that Ideas do not require such; and between his theory and that of Mr. Spencer it is not easy to see any difference. Berkeley imagined that his theory gave the death-blow to materialism, as, indeed, the denial of the existence of Matter would, at first sight, appear to do. Yet here we have Mr. Spencer, the prince of materialists, actually carrying Berkeley's views to an extreme never contemplated by their propounder.

Mr. Ground has done good service in pointing out the distinction between the metaphysical and the theological doctrines respecting the human will. As in the one, so in the other, there are various shades of opinion, the theologians believing that their views are in accordance with the Scriptures, while the metaphysicians consider theirs to be such as reason discovers. The various views prevalent among theologians divide conveniently into three primary ones:—1, that of the Pelagians, who deny that the descendants of Adam and Eve are born with a nature prone to sin, and who, consequently, look upon all mankind as morally free, requiring no spiritual aid to counteract the allurements of "the world, the flesh, and the devil;" 2, that of those who believe that all are born with the taint of original sin, and without moral freedom until divine grace confers it upon them by restoring them to that "image of God" which was lost to man through the Fall; and that, when they are thus restored, they are free either to yield themselves to the divine influence or resist it, as their will may determine; and, 3, that of those who, agreeing with the last-mentioned class in denying moral freedom to those unaided by grace, yet differ with them as to the effect of grace on the minds of those to whom it has once been imparted. Instead of holding that men are free to accept or reject spiritual influences, they believe that grace, once given, is irresistible, and that they to whom it is imparted, although still subject to sins and imperfections, will never be allowed to fall away finally and be lost. And inasmuch as the world, and even the Christian Church, contains many who show no symptoms of that improvement of character which is a mark of divine grace, it is almost a necessary corollary from this third division of doctrine that grace is not offered to all, and that many are left in that helpless and enslaved state from which nothing that they can do will save them. And such, accordingly, is the view adopted by most of those who hold grace to be irresistible.

The question, Which of these three theological views is the most conformable to Scripture, is one of pure theology, and it would, as I conceive, be out of place to discuss it in these pages. It is more to the point to observe that that they all belong to a region quite apart from the metaphysical question. The most strenuous asserter of free-will in the theological sense,—the Pelagian,—might, without inconsistency (however untruly), deny it with Mr. Spencer in the metaphysical sense. All that the Pelagian cares to assert is that all men are born free from original sin, and do not require divine aid to keep them from offending God. It is enough for him, therefore, that the will should be uncontrolled, either by sinful propensities on the one hand, or by spiritual influences on the other. This conceded, it is a matter of indifference to him whether, as a metaphysical tenet, the relation of the will to the brain-molecules be held to be that of master or slave. He denies original sin. To the metaphysician of Mr. Spencer's school it is a matter of no importance whether he does or no. It is a question into which the latter does not enter. He considers us mere machines, unable to direct or control our wills, which are the slaves of mechanical law; and it is nothing to him whether the impelling power is terrestrial or celestial.

REMARKS BY THE REV. CANON SAUMAREZ SMITH, B.D.

(*Principal of St. Aidan's College.*)

Thanks for sending me proof of Mr. Ground's paper. I wish I could be present at the discussion of it. It seems to me most important that the tendencies of Determinism current in some of the philosophical and scientific literature of the day should be strenuously opposed by philosophical arguments as well as by theological teaching.

I think that Mr. Ground has shown, clearly and temperately, the thoroughly unsatisfactory nature of Mr. H. Spencer's reasoning, in the extracts quoted.

Mr. Spencer refuses to take into account one side of the *dual* deliverance of consciousness. He reduces all his calculations to the standard of Matter, for, in spite of his language about Mind, he does in effect make Mind a product of Matter. He regards man as a bundle of transitory psychical conditions with no *ego*, as the subject of the mental phenomena, and yet he regards the phenomena as real.

He seems to treat of our consciousness as if it were not inseparable from *self*-consciousness. He argues, in fact, that this self-consciousness (by which surely we must mean consciousness of a freedom to will in a certain measure) is an "illusion"; and that instead of an individual power to choose, or refuse, certain lines of action, our "composite psychical state," in which we only imagine that we are exercising any personal volition, is a predetermined product of an "infinitude of previous experiences registered in (man's) nervous structure, co-operating with the immediate impressions on his senses."

Mr. Ground has clearly shown how Mr. Spencer contradicts himself in speaking of "the subject" of psychical changes, while he practically denies that there is any such subject.

No one can make a thorough philosophical estimate of human nature who ignores the *personal* side of the original "deliverance of consciousness." The "*I am*" of man lies at the root of all conscious exercise of intelligence, emotion, choice; and you cannot theorise away this positive factor into a mere mystical zero, any more than you can get rid of the great primal *I AM* by refusing to think of Him as knowable.

It is by means of *volitions* that a man is most directly conscious of his own personality. He knows that he can resist certain impulses and inclinations ; that he can refuse to do what he is commanded to do by others, or tempted to do by some motive to which his reason or judgment does not assent. Conscious of this freedom (for freedom it is, however it may be ultimately limited by Law or moulded by a higher Will), man feels himself to be a responsible agent. Without it, he would not be man.

The philosopher, metaphysical or ethical, must, if he honestly take into account all phenomena, treat the existence of free-will in man as a fundamental truth. The theologian has another question to deal with (though it is very much bound up with the broader philosophical one) when he inquires into the amount of moral strength, or extent of moral helplessness, found in the human will, after it has been once perverted by disobedience to Divine Law.

The metaphysical postulate is, that man's will is free : the ethical axiom is, that man is responsible for what he does ; the teaching of the Christian religion is, that man's will, perverted and enfeebled for good by sin, is by God's grace restored to the highest condition of freedom, where the Divine will and the human will concur, and in the *service* of God man finds his perfect *freedom.*

FURTHER REPLY BY THE AUTHOR.

I have now read with extreme care, many times over, the remarks made by the various speakers, and the notes since appended by Lord O'Neill and Canon Saumarez Smith. The whole forms, I think, an instructive commentary on the unity in variety which marks those who think alike on the deepest and most formative conceptions. There is one spirit dwelling in all,—the differences are only superficial, the unity is deep and structural. Necessarily from eleven minds united we get a larger and more complete view of the full-orbed truth than can be obtained by any one mind. As the chairman and several of the speakers agree that the Freedom of the Will is the one point wherein the upholders of Revelation and the Moral Law clash most distinctly, and in irreconcileable antagonism, with the advocates of Determinism and Automatism, I trust that the importance of the subject will justify me if I attempt to reduce to a consistent logical unity what has been contributed by all who have taken part in the discussion. Truth is one,—it is the intellectual expression of the one God ; all his servants have broken glimpses of the full-orbed idea ; what one lacks another supplies. Let us then try to blend all into one clear and luminous image. We all are agreed that the *ego* is an entity, the subject of its various states, which states, for convenience, we classify into intellect, emotions, desires, conscience, and will. Two (Dr. Irons and Canon Saumarez Smith) point out very justly that the *ego*, as the centre and seat of personality, is the active and determining power, holding in control all the faculties. Lord O'Neill, Prebendary Row, and others, show that to deny the existence of this *ego* is to deny the central fact of consciousness, on which consciousness all our knowledge founds. We all again agree that this *ego* has various desires, which clash one with another, and one (Rev. F. N. Oxenham) points out that Mr. Spencer's reasoning is justified, if there are *only* desires in us. But then we all assert that there is a power in us which rides above and controls the desires. Canon Saumarez Smith shows that it is the consciousness of this power which most distinctly calls up the sense of personality. Examining the nature of this power, the Rev. C. L. Engström points out that its chief office is directive, and not creative, pointing out a line to be taken, and not a *δύναμις* which moves along that line; and Mr. Enmore Jones fits it with this by reminding us that when our will has indicated the direction to be taken, a breath or *afflatus* sometimes comes upon us, which is like a wind swelling out our sails, and bearing us on in the direction to which we have made the prow of our ship to point. Now, a power which is directive is only an executive; it simply points out the way to be taken, and it needs the guidance of other forces, if, indeed, it be guided by intelligence at all. This intelligence we all assert. (Any one who says he is not intelligent probably speaks the truth.) But we all agree that this directive power in us is free; that it is under the supreme control of the *ego*. But being free, and able to steer any whither, it needs some object on which the eye can be fixed, which object, as Dr. Fisher reminds us, is what we call the determining motive. The motive chosen, he also says, is at once the outcome and index of the moral state. Dr. Irons, again, reminds us that the motive is only an incitement to action; it does not move us, it is the *ego* that is the moving force. Motive is only the object on which the *ego* has fixed, and it can no more move us than the pole-star can move the sailor who steers by it. Asserting, as we all do, that the *ego* has freedom of choice, Mr. W. Griffiths contributes valuable and weighty arguments in support of the proposition. The system of jurisprudence in all countries of the globe, he shows, implies it, and the distinction drawn between unintentional wrong, wrong committed by infants or lunatics, and wrong committed by criminals, shows clearly that all human jurisprudence makes intent or motive to be the essential factor in deciding the moral quality of an action. Professor O'Dell then shows that the extent of this freedom is unlimited, and that not even the tremendous penalty of eternal destruction can supply motive sufficient to move the will of some. We all agree that there is a power in us called conscience, which claims the right to decide the motives which we choose to rule us, and that on disobeying this power we incur the condemnation called guilt. The Rev. C. L. Engström then puts the climax on the metaphysical argument by showing that we reap as we have sown, we are changed into the shape of the motive we have chosen to rule us.

We come next to the bearing of the question on theological truths. We all hold that although man is free, he has yet not strength, of himself, to choose the right and the holy. This inability seems to me explained by the two truths urged by the Rev. C. L. Engström and Mr. Enmore Jones. The first shows that the will is directive. Therefore, willingly yielding to the gentle pressure of the good spirit, a man may himself fix his direction towards good. But this mere direction *has no dynamical force*, it is only something which can point. Behind this directing element, then, a power in the nature of an energy, or a δύναμις, may come, which can fill out the directing will with a heavenly power, and bear it onward, in the direction it has chosen, towards the embodied motive which it has selected to rule. This has seemed to me for some years the philosophical reconciliation of the two counter-truths of man's freedom and responsibility (growing, as Prebendary Row remarks, out of the very centre of the moral character of God), and of man's need of divine grace, laying the axe at the root of all human pride, and bidding each one of us remember that we are only empty vessels, which, to be of any use, the divine fulness must fill. I think this welds into a coherent logical unity the substance of what has been said.

ORDINARY MEETING, JAN. 16, 1882.

REV. PREBENDARY CURREY, D.D., MASTER OF THE CHARTERHOUSE, IN THE CHAIR.

The minutes of the last meeting were read and confirmed, and the following elections were announced :—

MEMBERS :—W. P. James, Esq., M.A., Oxon, London ; J. Scott, Esq., Galashiels.

ASSOCIATES :—E. Chance, Esq., Cantab., London ; S. R. Pattison, Esq., F.G.S., London ; Rev. H. K. Simcox, M.A. Oxon, Devizes ; H. G. Emeric de St. Dalmas, Esq., London.

HON. LOC. SEC. :—Rev. W. Shaw, Keighley.

Also the presentation of the following works for the library :—

"The Christian Philosophy Review." Part I. *From the Institute.*
"American Antiquarian Journal." *From the Society.*
"The Illustrated Apocalypse." By T. W. Greenwell, Esq. *From the Author.*
"Plant Life Remains in Coal and Anthracite." By Professor Reinsch.
"Unity and Harmony of God's Work." By J. Coutts. *From the Author.*
A Small Work by the Rev. C. B. Brigstocke.

The following paper was then read by the author :—

BIBLICAL PROPER NAMES, PERSONAL AND LOCAL, ILLUSTRATED FROM SOURCES EXTERNAL TO HOLY SCRIPTURE. By the Rev. HENRY GEORGE TOMKINS.

THOSE who know the kind of interest which Mr. George Grove has described as springing from the study of Biblical names, will lend a willing ear to anything that will help toward the cultivation of so fruitful a field.*

More to stimulate than to satisfy such interest I venture to lay before you some inquiries into the bearing of late researches on this matter.

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* *P.E.F.*, 1880, 197.

⁂ For the convenience of reference, the pages of this paper have been numbered at the bottom.

In 1865 a very useful work was published by the Rev. W. F. Wilkinson on *Personal Names in the Bible.*[*]

I recommend this little book to the attention of students; but its perusal will show how much ground has been gained within the last sixteen years. This will easily appear by collating the work with the index of Bible names given by the Rev. T. K. Cheyne in the *Variorum Teachers' Bible* of Messrs. Spottiswoode (1880), and there is still much to be done in explaining the origin and affinities of Biblical Proper Names.

All kind forbearance I must crave, for the subject is immense and most difficult, and while I have been turning it over, new lines have been struck out, as, for instance, by Professor Robertson Smith in his paper on *Animal Worship and Animal Tribes among the Arabs and in the Old Testament;*"[†] and important material has been contributed by M. Lenormant in his work *Les Origines de l'Histoire* and by Dr. Friedrich Delitzsch in his essay on the *Site of Paradise,*[‡] which contains a profusion of geographical knowledge far beyond the limits suggested by the title. M. Derenbourg has also compared the proper names of persons in the Old Testament with those of Himyaritic inscriptions, in an interesting article in the new *Revue des Études Juives.*

But for a rash promise I should have shrunk from this difficult topic altogether; but I hope to show how in various directions the names of the Bible agree with the assumed conditions of the holy writings, and may help us in further fruitful studies to the glory of that "Name which is above every name."

Names Personal and Local.

Personal and local names are vitally connected. Men of old loved to "call their lands after their own names," and were called after their native land, and the man gave name to his race, which is included in a vivid way in the personal name and the territorial. So it is often hard to know whether we are reading of men, or tribes, or cities and regions, for all have their pedigrees, and the fashion of recording them was often similar or the same.

M. Clermont Ganneau[§] has noticed, for instance, that the modern name of the Belka is the same as that of Balak, king of Moab (compare Belkis, queen of Sheba, H.G.T.); that

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[*] Strahan.

[†] *Journ. of Philology,* ix. 75.

[‡] *Wo lag das Paradies?* Leipzig, 1881.

[§] *P.E.F.* 1881, 12.

Shihân, where M. de Vogüé found a magnificent bas-relief of a king, is the same word as Sihon, king of the Amorites; the Aujeh, an affluent of the Jordan, as Og, king of Bashan; Ajlûn as Eglon, king of Moab, &c.

And if personal and ethnic names have been thus sown in the earth, no less have attributes of Godhead grown into titles of renown, and clad heroes of old with mantles from the skies, so that *numina nomina* is as true as the converse *nomina numina.*

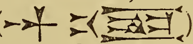
If Laban, and Makhir, and Gad, and Adrammelek were names of gods, they were borne by men of the Old Testament as naturally as the names Hermes, Nereus, and Phœbe, by men and women of the New Testament. Erroneous inferences have been drawn from this, the extreme use of divine names: the subordinate use in compound names is very interesting.

As in former papers, I must avoid the more accustomed lore, and take up a selection of typical instances, for the most part, perhaps, unfamiliar to the student of the Bible.

With regard to local names within the Holy Land, the great survey of Western Palestine, with its accompanying books, quarterly statements, and memoirs, has given us an almost endless amount of information, on which I shall draw very little in this paper. The survey of Eastern Palestine, now in progress under Captain Conder, R.E., will not be an unworthy supplement to the former.

Names containing Divine Titles.

A large proportion of names personal and local were built with the name or title of some god. Both in and out of the Bible these words abound. For instance, Ab (father), Akh (brother), Am (in the sense of kinsman), are constantly joined to the names of gods, and I think generally used as a predicate:—Abiah, for instance, "A father is Yah."

After all that has been said of the name Abram, may it not be classed with Abi-ram, Akhi-ram, Adoni-ram, and Malkhi-ram, and Am-ram, and explained by the name of the god Ramu* ()? Hesychius gives Ῥάμας, ὁ ὕψιστος θεός. Thus we have an Ab-ramu in the reign of Esar-haddon,† and an Akhi-ramu (a Syrian) in the Annals of Assurbanipal, and a Ba'al-ram in a bilingual Phœnician and Cypriote inscription.‡ We know that in Chaldea Abram's fathers

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* *T.S.B.A.*, vii. 90. † *Ep. Canon* 69, *Rec.* iii. 52. ‡ *T.S.B.A.*, i. 155.

"served other gods," and if indeed his original name was of this class, then a divinely-given change of name would be the more naturally explained. The new name Ab-raham, generally interpreted as "father of a multitude" is elucidated by Harkavy in the light of the Assyrian *rahimu*, loving, as "loving father." Compare with this in *sense*, Isaiah, xli. 8. "Abraham that loved me," although the verb is different. I do not say that Harkavy is right.

Very many names of this class are obvious enough, as Akhi-yah, Abi-yah, Ammi-el, Ammi-shaddaï, but in many cases we have not yet traced with certainty the latter element.

Akhi-man was one of the "three sons of Anak"[*] whom Caleb drove out from Hebron. Is the *man* in this name "Manu the Great" of the Babylonians, the god of fate?[†]

In the group of names ending in "hūd" (Abihud, Akhihud, Ammihud, Ishhud) is this the Hūd of the Egyptians, the solar winged disk, or may it be the Akkadian sun-god Ud, or are both identical?

Akhi-mōth seems to involve the name of the Phœnician Pluto, Mōth.[‡] The local names Hazar-maveth or Hazar-mōth, and Az-maveth or Beth-azmaveth, are parallel.

In Abi-melek, Akhi-melek I think we have a similar case, the name of the god Melek or Molek being compounded; which is, of course, rather an epithet, like Ba'al, than a name.

In Abi-no'am and Akhi-no'am a title of Tammuz may be found, as Mr. Cheyne has so well pointed out in the Syrian Na'aman. [§]

In Assyrian annals we have Akhi-melek, Abi-melek, Akhi-tōb, and the like.

I think Tōb must be distinctly a divine title. It is, however, obvious that it was a gradual growth that gave such epithets as "good," "high," "just," the force of a separate divine personality; and they were challenged for their rightful owner in such names as Tob-adoni-Yah, just as another familiar heathen title in Ba'alyah "the master is Jehovah," or Yobel.[||] How curious is the name of a son of David (whose mother was one of the wives whom he took in Jerusalem) Ba'alyāda, elsewhere called El-yāda ("Ba'al knoweth," "God knoweth.")

Even Zedek in Adoni-zedek and Melki-zedek may be the god of the Phœnicians. Melkizedek may have had a heathen or half-heathen name given to him by such parents as Abram had, and yet have retained, or revived, as pure a worship of the Most High God as Abram offered. The name of Ba'al-zebul, lord of the height, like Ba'al-ram, is a most fit title for the Most High God, but these and other sublime names were debased to hell by the "many inventions" of pantheism, and polytheism, and what has been called by Professor Max Müller "henotheism." Names compounded with Tōb, Zedek, and the like, remind us of Mr. Budge's remark that there were temples erected in Babylonia to abstract qualities,* which are mentioned in fragments of cylinders of Nebuchadnezzar. Zidqa is the name of a king of Sidon in the records of Sennakherib.

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[*] Josh., xv. 13.

[†] *Chald. Magic*, 130, 133.

[‡] Lenormant, *Les Origines*, 546.

[§] Isaiah, i. 104.

[||] Judges, ix. 26; lxx.

Other names are derived from those of gods with an addition of *i*, as in patronymic or gentilic names; as Barzillaï from Barzil a title of Ninip an Assyrian god. Under this head I think Sheshaï and Talmaï, two of the "sons of Anak," come. The former seems connected with Sheshan, and Shesh-bazzar, the numeral *shesh* (six) lying at the root, as a symbol of a god. It symbolized the god Bin or Ramanu. Ba'al Shalisha indicates *three*. I have elsewhere traced "Arba" (four) in connexion with Kiriath-Arba' and other places.†

Sheba (seven) appears in Bath-sheba and other names, and may be connected with the god Sbat, and the Seb of the Egyptians. And Eshmūn, (eight) the eighth of the Kabīrim, is well-known. But these remarks on numerical symbols are parenthetic and illustrative of Sheshaï.

In like manner Besaï seems clearly to indicate the god Bes, or Besa, of Arabian origin, of whom the Egyptians were so fond, his deformed visage being associated with articles of the toilet.

Brugsch has very naturally connected with him the feminine Beset (or Bast) whose name appears in Pi-beseth (Bubastis) in Lower Egypt.

I have often thought that the familiar play on the word bōsheth (which in the Hebrew means "shame") in connexion with Ba'al-worship may have some allusion to this goddess of Eastern origin.

Sippaï (or Sapi), ספּי, and Saph or Sap, ספּ, equally recal Sap, the god of the Eastern borders of Egypt. And Bebaï seems clearly enough derived from Beb, a Typhonic name well-known in Egypt and Sinaïtic Arabia, as I have already suggested elsewhere.*

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* *Ch. Sunday Sch. Mag.*, 1880, 244.

† *Trans. Vict. Inst.*, 1877 : *Studies on the Times of Abraham.*

Hori, Horaï, Huraï, are perhaps derived from the Egyptian god Horus, and Hur is supposed to be included in the same category.

Hori (like Seti, Ameni, and other names familiar enough), is a pure Egyptian name. So is Hora (הרא), and Harnefer is found in Egyptian inscriptions, meaning "the good Horus." †

Maharaï, מהרי, the name of one of David's valiant men, is very interesting. It is derived from *Mohar*, a Semitic word for a hero or champion which was introduced into Egypt about the time of Râmeses II. Compare the Carthaginian Mahar-bal.

Aziza is a curious name with which we compare the Nabathæan god Aziz, and the well-known Abdul-Aziz of these days. ‡

From Egypt we gain much in the explanation of Biblical names. Puti-p-ra and Puti-p-har (which involves the name of Horus, not of Ra) are well-known. § To these we add Puti-el, a compound of Egyptian and Semitic exactly paralleled by the Pet-Ba'al mentioned by Brugsch. Puti-el was the name of the man (Egyptian ?) whose daughter was the wife of Eleazar, son of Aaron, and mother of Pinehas. This name, Pi-nehas, Brugsch claims as Egyptian ‖ (from Nahasi, the negro; perhaps he inherited a dark complexion from Puti-el.) Lui (Levi) was the name of a high-priest of Amen under Meneptah, and therefore probably contemporary with Moses.

May not Miriam be one of the many Egyptian names beginning with Meri ? Râmeses II. bore the well-known title of Meriamen, and so did one of his daughters, while the princess Merris¶ (Meri, one of the younger daughters of Râmeses) is said to have been the protector of Moses. Now Miriam is called by Josephus Mariamne, and the same form of the name became famous in the Herodian house. Does not this make it probable that Meriamen was the original name, perhaps shortened from aversion to the full Egyptian form ? The same name Mariamne or Mariamme belonged to a place in Syria, west of Emesa, and in this case it seems likely enough that the name was that of Râmeses Meriamen, who founded (or refortified) a strong post in that part of Syria under his own name.

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* *Trans. Vict. Inst.*, xv. 90.

† *Deveria Cat. MSS.*, 66.

‡ Ezra, x. 27 ; Pierret, *Petit Man.* 100.

§ *Trans. Vict. Inst.*, xv. 91 ; Ex. vi. 25.

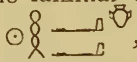
‖ Brugsch, *Hist.* ii. 130.

¶ Euseb., *Præp. Ev.*, ix. 27 ; Brugsch, *Hist.*, ii. 112.

The Egyptian women Shiphrah and Puah bore names which have been explained in accordance with hieroglyphic names in inscriptions.*

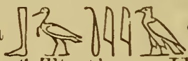
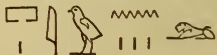
That the Israelites should have among them a number of Egyptian names is also to be expected from their long continuance in the land first of their refuge and prosperity and then of their bondage, and I think they will be found on careful search.

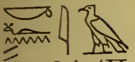
Amon is purely Egyptian, the familiar name of the great God. Asir is probably to be taken as the name of Osiris. Compare Abd-osir and Osir-Shamar in a Phœnician inscription found in Malta. †

Kheper, with the local name Gath-Kheper, bring to us the name given to the creator Ptah, and symbolized by the scarabæus (חפר). It is curious, moreover, that the name of the late Pharaoh "Hophra" is given as חפרע, as if it were the familiar Khеprā of Egypt. It expresses, however, the , Haabra of the inscriptions.

Surely Sia (סיעא) ‡ and still more clearly Siaha (סיעהא)§ must be Si-aah, son of the Moon-god, and Akhi-ra is a cross-bred name, like Puti-el, "a brother is Râ," the great Egyptian sun-god.

Bathyah (בתיה) || "the daughter of Pharaoh" may well stand beside Bath-anat (or Bent-anat) the favourite daughter of Râmeses II., the form of names being parallel and purely Semitic.

The divine name Yah seems to me to be equally involved in the local name Beth-ia ¶ in the Karnak lists of Palestine of the time of Thothmes III. If it be really so it is well worthy of remark, and may fitly stand beside the name in the list No. III. in Mariette's Karnak, which Brugsch identifies with Penuel  *Paaun'el.*** Beth-yah would be nearly equivalent to Beth-el.

Another name, long before the Exodus, appears to contain the divine appellative Yah. It is the remarkable name of a man in Egypt in the time of Amenhotep I. Kafeniāa . The first element is חפנ,* which occurs in Khafni (Hophni) a pugilist, and is also found among names in Himyaritic inscriptions.† The composite name would mean "a combatant is Yah."

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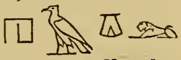
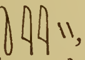
* *Sp. B.*, *Ex.* i. 15 ; Vigouroux, *La Bib.*, ii. 230.
† Cheyne, Isaiah, ii. 135 ; Exodus, vi. 24 ; *Ebers, Aeg.*, 159.
‡ Neh., vii. 47. § Ezra, ii. 44. || Chron. iv. 18.
¶ No. 97. ** 312.

Some other Egyptian Names.

It is worth while to mention, by the way, that one of the earliest Egyptian names in Holy Scripture, Hagar, occurs as the name of a king of the XXIXth dynasty  Hag'r) known by the Greeks as Achoris; Brugsch spells the name Hagar.

Takhpenes (תחפנים) is the name of an Egyptian queen‡ whose sister married Hadad the Edomite in the time of Solomon.

Now the name Ta-apenha occurs as that of the Mother of Aahmes,§ an officer of Darius in Egypt. The local name given as Tahpanhes appears as Ta-benet in the Delta, the Greek Daphnæ Pelusiæ, and the present Tell-Defenneh, if Brugsch be right.||

I fancy that some Biblical names may throw light on the interesting question of the race to which we must ascribe the beautiful queen Thii , the consort of Amenhotep III., who is believed to have been a foreign princess, and who appears to have introduced the worship of the solar disk (*Aten*). Her father's name was Iuaā, and her mother's Tuaā. In the Louvre is a group of an Egyptian nobleman,¶ with his wife Taeï, and their infant. Her complexion, like that of Queen Thii, and this race, is painted rosy, and not yellow like the Egyptian women. Iuiu, Uaï, Naï, are names belonging to the same race, neither Egyptian nor Semitic.** It was conjectured by M. Emman. de Rougé that they were Libyans. But we find some names in the Bible of a similar cast, and in a quarter with which the Egyptians had much to do. We find a Taï,†† or Toü (or Thaï, Thoü) king of Hamath, with a son Iuram, or Ioram. (Heb. תעי or תעו; and יורם, or הדורם, Hadoram). Now Hamath was at that time (of David)

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[*] Lieblein, *D. de Noms*, p. 183; Brugsch, *Hist.*, i. 255.

[†] *Rev. des Etudes Juives*, i. 50.

[‡] 1 Kings, xi. 19.

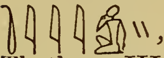
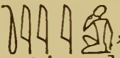
[§] Cooper, *Arch. Dict.*

[||] Brugsch, *Hist.*, ii. 358.

[¶] M. De Rougé, *Du Louvre*, 32.

[**] Pierret, *Dic.*, 533.

[††] 2 Sam., viii. 8, 9; 1 Ch., xviii. 9.

an independent Hittite kingdom, the rival of Syrian Damascus. I would compare the name of Thaï or Thaü with Thii and Taei, and that of Iuaā, her father,* with עִוָּא, Iva, or Ava, a city mentioned in connexion with Hamath. The Syrian regions of the Hittites, and the land of Naharina, were familiar to Amenhotep III. And I would set these names beside that of a town in Syria, Thiaï, or Thai, or Thia , , mentioned in the Karnak lists of Thothmes III. next in order to Shabtuna,† an important place near the lake of Kadesh on the Orontes, and not far south of Hamath, in the midst of the Hittite region. The Hittite ladies appear to have been fair in complexion and to have had delicately-formed features, as shown by a beautiful relief in porcelain in the British Museum. Is it not probable that these fair foreigners in Egypt were Hittites, and not Libyans?

From the time of the Hyksôs, or even before, Egypt gives us many traces of Biblical names.

For instance, Shua, the "Canaanite of Adullam," whose daughter Judah had married, is the familiar name of the Hyksôs themselves, Shaua.

Anub and Anan (Onan) are among the names of the Hyksôs rulers.

Sekhem was not only the name of the renowned city below Gerizim, but also of a district of the Delta, whose capital was Pi-beset (Bubastis), and its Egyptian meaning was not only "sanctuary" but "possession," as in Jacob's words in his blessing of Joseph.‡

Compare, again, the mutilated name of the time of Meneptah "Ba'al . . . son of Zapur"§ with Balak, son of Zippor, of the same period, and remember that Zipporah, the wife of Moses, was a Midianite, not far removed from Moab.

Names in Palestine and Syria.

As regards the nations by whom the land of Canaan was inhabited, we have increasing light from Egypt and Assyria, taken together with the evidence of existing names and living men.

Take the Kheth of Scripture, Kheta of Egyptian monuments, Khatti of Assyrian annals; that splendid race whose ruin-heaps still bear such names as Tell Ketîn in northern

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* 2 Kings, xvii. 24; xviii. 34; xix. 13; Isaiah, xxxvii. 13. † No. 74.
‡ Gen., xlviii. 22. Pierret. *Vocab.* 531, 532. § Brugsch, *Hist.* ii. 125.

Syria, Heit near their ancient lake of Kadesh on the Orontes, and Hattîn near the Sea of Galilee.

Their existence as a formidable race on the west of the Euphrates is attested in the time of Abraham, not only by the allusions in the book of Genesis but by curious passages in the records of Sargina and his son Naram-Sin, by whom they were conquered for a time. From the reign of Thothmes III. they occupy a signal position in the records of Egypt for some centuries, and the "Kings of the Hittites" are no less important to the Egyptians than to David and Solomon and their successors until they were finally subdued by another Sargon, rather more than 700 years before Christ. Professor Sayce, Mr. Boscawen, and others have already given us so much interesting information about the Hittites that we ought to take heed that impending discoveries do not languish for lack of public support and sympathy. That distinguished officer, Captain Conder, R.E., has recently visited the Upper Orontes, and, as he and Lieutenant Mantell believe, has identified the renowned stronghold of Kadesh where the great exploit of Râmeses II. was performed. I do not think he has hit upon the right spot yet. But when Kadesh is found we shall possess, as it seems, a Biblical site. For in one passage, at least, this sanctuary is mentioned, namely in the account of David's census,* where we are told that Joab and his officers crossed the Jordan and worked northwards through Gilead "to the land of Takhtim-Khodshi."

All the translators have been baffled by this passage. At last, however, Mr. Cheyne and Mr. Driver, following four codices of the Septuagint, have restored (as it appears) the true reading, and we find Joab passing through "the land of the Hittites unto Kadesh." The difference in the Hebrew is but slight, but the meaning as clear and obvious as possible. I have also some belief that this Kadesh occurs in a familiar passage. The magnificent twenty-ninth psalm describes the thunderstorm rolling over Lebanon, breaking the cedars and shaking the "wilderness of Kadesh." Now it seems to me that the region of the highest waters of the Orontes, where Kadesh stood by its lake beyond the northern end of the Lebanon, where the storm would roll across to the mountains of the Ansairieh, is a far more likely wilderness (*midbār*) to pass before the mind's eye of the poet than Kadesh Barnea three hundred miles to the south. If that be so, then this capital of the Hittites, next in renown to Karkemish, is twice mentioned in holy Scripture.

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* 2 Sam., xxiv.

In treating of Biblical names, it is only fair to allow that the Hittite names recovered from Egypt and Assyria differ in character from the few that appear in the books of Scripture. But the whole question is in a very nebulous state at present. The lists of names which appear to include those of Hittite places and persons present a curious mixture of Semitic language with some other element. The names in Scripture may be Hebraized. Some Hittites (Uriah for instance) may have received new names. And we must wait with patience for a solution which will most likely come in due season.

The Amorite is well known in Egyptian record and wall-sculpture, and at this day both Northern Syria and Southern Palestine bear witness to his dwelling-place, herein confirming the notices of Scripture.

Tell Amûrîn, north of Hamah, 'Amary, by the Lake of Kadesh, Tell 'Amârah in the Lejah, and in the south the 'Amârîn mountains and other places, are stamped with this ancient name. In the great battle-pieces of Egypt they appear in their strong chariots and on their castles "walled up to heaven," with bow, and buckler, and spear. They are closely associated with the Hittites, and "the land of the Amorites" round the Upper Orontes tallies exactly with that of the book of Joshua,* where Aphek (Afka) is on their border.

The Amorite has marked one celebrated mountain, "Mount Hermon, which Hermon the Sidonians call Sirion; and the Amorites call it Shenîr,"† and in Assyrian history it bears the Amorite name of Shaniru.

The Gergashite (גרגשי), is likewise found among the northern allies against Egypt, if we take the probable explanation of the Kerkesh mentioned in the monuments of Râmeses II. It seems to me that the name is preserved in Gergis, marked in Rey's map, very near the Orontes, to the west of Er-Restan (Arethusa), in a most probable position for the Gergashite.

The Khivvites (Hivites) were a people of renown in the days of Moses, and long after. Dr. Friedrich Delitzsch‡ has just identified them with the Khavvat of the Assyrian inscriptions (hitherto read Khammat and confused with Amat Hamath). A very important nation they were in the days of Shalmaneser II., who links them with the "Kings of the Hittites,"* under their king, Irkhulina, in a great league with Benhadad against the Assyrians, who defeated them with terrible slaughter at Karkar.

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* Josh., xiii. 4.

† Deut., iii. 9.

‡ *Wo lag das Paradies?* 276.

This agrees very well with the mention of "all the cities of the Khivvites"† with Sidon and Tyre. But I must not attempt to go through all the coincidences of Scripture with the monuments as regards the races of Canaan and Syria. I will only mention the name Mat-amim in the travels of the Mohar, a well-known story of an Egyptian scribe. For Mat-amim would simply mean land of the Emim.

Some Babylonian and Assyrian Names.

And now we must turn to Babylonia and Assyria, whence most important results have been already obtained in the elucidation alike of very early and late names in the Old Testament.

Akkadian, Sumerian, Kassite, Elamite names on the one hand, and Semitic names on the other, have enabled us to verify the historic data of Scripture to an extent quite unexpected and surprising. Thus we have Babel, and Erech, and Akkad, and Kalneh, and Ur, in the records from the earliest times. For the name Nimrod we have more than one derivation. Professor Sayce and M. Grivel give the Akkadian Namar-ud, illumination of the sun (which by no means excludes his human status by the divine solar title), and Dr. Friedrich Delitzsch has lately suggested the possible alternative of *Nu-Marad*, "Man, or hero, of Marad,"‡ a very ancient Chaldæan city. This distinguished Assyriologist has treated very carefully the subject of these local names in his new work, *Wo lag das Paradies?* M. Lenormant will doubtless deal with them in the next volume of his newly-cast *History of the East*; and those who do not seek information beyond our own language, will find much in George Smith's very useful *History of Babylonia*, edited by Professor Sayce, and in the *Chaldæan Genesis*, and also in the volumes of *Records of the Past*.

One of the most striking points in this non-Semitic lore is the occurrence of the Elamite name of Kudur-lagamar, with his tributaries in the fourteenth chapter of Genesis, of which I have treated on a former occasion.*

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* *Rec.* iii. 99; v. 32.

† 2 Sam., xxiv. 7.

‡ *Paradies*, 220.

Contemporary with these rulers we may cite Semitic names of considerable interest. Mr. Boscawen writes to me: "Some time ago I made a special study of a number of early Chaldæan tablets of a commercial nature found at Warka [ancient Erech] and Mugheir [Ur of the Chaldees]. These are dated in the reigns of Eri-aku or Erioch (Gen. xiv.), and of Hammuragas, and others of that period, and among them I found such names as Abu-Khibu, "father of concealment," Bel-ni, "my lord," Abbu, "green" [cf. אב, but may not the meaning be "fruit?" see Gesenius]; Banu בנה; Lazibu (לצב), Kainu (כונ) [קין?], Ram-ena-ya "the lifter up of my eyes," Mukhaidū (מחרה), "the joyful one" [? מחירה, Ezra ii. 52., Neh. vii. 54, "perhaps a joining together, Ges.] Abil (הבל) [*Abel.* It is very interesting to find this name, "a son," used absolutely. It was Dr. Oppert who first pointed out the true meaning of *Abel* from the Assyrian]; Abil-irziti, "son of the soil"; Miss Braddon's "only a clod?" [does it not rather mean "son of the land?"] Akhu Sunu (their brother) Akhu-kalli "brother of all," Pirkhu (פרח). There are more than a hundred names of this class," Mr. Boscawen adds. I trust he will make public his study of this very important collection of Semitic names of so early a date. Meanwhile we have here the names Cain and Abel, for Mr. Boscawen identifies the former name in a paper contributed to the Palestine Exploration Fund's statement.† Mr. Pinches has remarked: "almost every proper name in Assyrian, as in Hebrew, tells of some event or circumstance connected either with the birth or the life of the person bearing it."‡

This is very well brought out, with fine feeling and reverence, by Mr. Wilkinson in his work before mentioned on the Personal Names of the Bible. A large number of such names are actual sentences that will stand on their own feet, alike in Babylonian, Assyrian, and Hebrew names.§ But we must not enlarge on these.

The names which emerge in the captivities on the Tigris and Euphrates are interesting; such, for instance, as those given to the noble Jewish captives in Babylonia. I suppose Belteshazzar (בלטשאצר) is Bilat-sarra-utsur, "Beltis defend the king." M. Lenormant has suggested that שדרך (Shadrak) may well stand for Sutruk or Sudruk, an Elamite name naturalised in Babylon. And as to Meshak (מישך) he says it is evidently an alteration,[*] under the hands of transcribers, of an original form where the latter element of the Jewish name of Mishaël has been replaced by the appellative of some Babylonian god, perhaps Misha [Marda]kh (Assyrian Ma-sa-Maruduk), and compares the great contraction of Assurbanipal into Asnappar.

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* *Trans. Vict. Inst.*, xii. 37; also see *Studies on the Times of Abraham.*

† *P.E.F.*, 1881, 224.

‡ *Rec.*, xi. 22.

§ See also Lenormant, *Les Origines, &c.* xi. 153.

But may not the contraction be rather of Misha Sheshak (Assyrian Ma-sa-Sisku) into Meshak?[†] Dr. Lauth has suggested that Sisku may be a divine name, meaning "the brilliant protector" (Marduk?) Sir Henry Rawlinson had connected the same word with the passages in Jeremiah,[‡] where the name Sheshak is mentioned in connexion with Babylon, and had taken the word as a divine name.[§]

Animal Names.

But this paper must not be unduly protracted, and we will now turn to a very different topic, the use of animal names. To these Professor Robertson Smith has called our attention in the *Journal of Philology*, in his remarkable and very striking paper on "Animal worship and Animal Tribes among the Arabs and in the Old Testament."[||]

In this paper he connects the "Totem-worship" with its apparent origin and consequences, among barbarous tribes, as expounded by Mr. Maclennan, with usages and tribal and personal names among the Arabs, and through Arabian channels with the tribes of the Hebrews, but especially Judah, and in a smaller degree Benjamin, Simeon, and Dan. There is much that is very shocking and sorrowful in this disquisition, as in other recent inquiries of a similar kind. This should make us the more highly value the "sweetness and light" of Moses and Samuel and the prophets.

The class of animal names are claimed as derived from a stage of fetish-worship, and "the line of descent is through the mother who gives her totem to her children." This is connected with abominations proscribed in the books of Leviticus and Deuteronomy, of which the very proscription proves its own need.

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[*] *La Divination*, p. 178.

[†] *Proc. S. B. A.*, 1881, 48.

[‡] Jer. xxv. 26; li. 41.

[§] Her., i. 506.

[||] *Journ. of Philology*, ix. 75.

It seems to me that Mr. Robertson Smith has made out a strong case with regard to the Arabs in their pre-Mohammedan ages; and he is quite right in tracing the influence of their tribes in southern and eastern Palestine; and perhaps in a great degree he justly connects even in the days of David the outrages against Mosaic rules of domestic morality to such sources as he indicates. Some of the most interesting names involved in this inquiry are such as Oreb (Raven) and Zeb (Wolf); Caleb (dog) whose position as a proselyte from Edom has been so well traced by Dr. Plumptre in his excellent *Biblical Studies*;* Khamōr of Shekhem (wild ass), Ja'el (Ibex); Epher and Ephron (Fawn), 'Eglon (calf), Akhbor (mouse), Shaphan ("cony" or rock-badger), Khezer (swine); and the like.

Doubtless the question thus raised will be carefully considered and examined in detail by those best qualified to decide on its merits. The subject of Biblical names could not be fairly treated without indicating this fresh departure. Let us remember that it is not the judgment of the prophets that is impeached by any of the painful exposures of religious defection in the children of faithful Abraham. There is much justice in the concluding sentences of the essay. "It is a favourite speculation that the Hebrews or the Semites in general have a natural capacity for spiritual religion. They are either represented as constitutionally monotheistic, or at least, we are told, that their worship had in it from the first, and apart from revelation, a lofty character from which spiritual ideas were easily developed. That was not the opinion of the prophets, who always deal with their nation as one peculiarly inaccessible to spiritual truths, and possessing no natural merit which could form the ground of its choice as the people of Jehovah. Our investigations appear to confirm this judgment, and to show that the superstitions with which the spiritual religion had to contend were not one whit less degrading than those of the most savage nations. And, indeed, the second commandment, the cardinal precept of spiritual worship, is explicitly directed against the very worship of the denizens of air, earth, and water, which we have been able to trace out. It does not appear that Israel was, by its own wisdom, more fit than any other nation to rise above the lowest level of heathenism."

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* Strahan, 1870.

Conclusion.

It is only due to my audience and to this vast and fertile subject that I should end as I began by craving your kind forbearance.

There are some branches of the inquiry into Biblical names too sacred and dark with glory, some too fresh and uncertain, some too old and familiar, to serve our purpose this evening. But within my old line of historic illustration I must affirm that to me there appears a coherency between the names, brought from quarters scattered and for all the intervening ages forgotten and unexplored, and their position and surroundings, in the Scripture narratives, or oracles, or poetry, which to an honest seeker after truth is "confirmation strong," and may well rank high as "proof of holy writ." It has been elaborately shown by the recent surveyors and explorers of Palestine, that the geographical and topographical names mentioned in Egyptian and Assyrian monumental records, and in classic and rabbinic literature, and now found in the mouths of the fellahîn, in numberless instances chime with the Bible story.

If we have caught this evening startling glimpses of "high places" and "chambers of imagery," it is only what a thoughtful student of Scripture might expect; and readers of Pleyte, Tiele, and similar writers, have seen the dark shadows cast in gigantic proportions. Out of how rough and deep a "hole of a pit" has our Redeemer in all ages drawn the fair stones of His new Jerusalem! How does the perverse mind of man forsake the living fountain, and hew out for itself broken cisterns.

We would "justify the ways of God to man." We cannot justify the ways of man to God.

APPENDIX.

My best thanks are due for several kind contributions of notes and suggestions received since the above paper was printed.

The Lord Bishop of Bath and Wells writes:—

Very many thanks for your valuable, interesting, and suggestive paper.

The animal names strike me as very interesting, and the argument from the agreement linguistic, moral, and religious, between the names and the surrounding circumstances of those who bore the names, is very cogent as unmistakable evidence of historical truth. As regards Caleb, to whom I see you refer at p. 15, I believe the discovery of his Edomitish ancestry and the proof of it was my own, as given in ch. ii., sect. ii., of my *Genealogies*. I have not seen our Dean's *Biblical Studies*, to which you refer.

The Rev. T. K. Cheyne, Fellow of Balliol:—

A number of combinations are quite new to me. Maharaï=Mohar is very attractive. Sippai, Bebai, Besai, Shua, Zapur: Sheba, as connected with Sbat and Seb. (Do you mean that the connexion with "seven" is a "Volksetymologie," Gen. xxi. 30? or that "seven" is a numerical symbol for the Egyptian god?) Can you trace a connexion between Bast and Baal, as objects of worship? Otherwise, are we helped by the similarity of Beset and Bosheth? [See below.—H. G. T.]

Barzillai, Sheshai, Talmai. The first must be very plausible, for it strikes me at once that I have heard it before, and yet I do not think I have.

I would rather not have to do with an Accadian god in a Hebrew name, until I am compelled (Ammi-hud).

Zedek. It occurs as a separate divine name in Philo of Byblus, does it not? Zidqa is evidently adopted from a god.

Tob, I suppose, does not occur alone as a personal name (a *region* in "Judges").

Abraham: I remember Harkavy, but think it is delusive. Better an Aramaïsing pronunciation of Abram.

Cain: very interesting. We had only a Himyaritic Qainu before?

Abil-irziti. ? comp. (אזרח) אזרחי the patronymic.

As to names compounded with *ab*, *ab*, *ach*, &c., comp. P. de Jong, "Over de met *ab*, ach, enz, zamengestelde Hebreeuwsche eigennamen. Amsterdam: J. Müller, 1880." Noticed by Graf Baudissin in the Leipzig *Theolog. Literatur-zeitung*, Jan. 1, 1881. I have no doubt you know Nestle's *Die Israelitischen Eigennamen*, Haarlem: 1876. On the compound names the two appear to differ—De Jong thinking that Nestle and those who agree with him have gone too far. I have not seen De Jong's book, and my prejudices are with Nestle. De Jong seems to think that divine names were sometimes otiose, and merely added to make a new name ("like Hermobios with Bios, and Diogeiton with Geiton"). He so explains names like Abijah and Achijah.

I see you have given Mr. Driver and myself the credit of the emendations in Samuel. Hitzig and Wellhausen were, as noticed in Q. P. B., our authorities. "Wilderness of Kadesh." Very plausible, supposing the psalm to be an early one. [Is it not, as generally accounted, "a Psalm of David"?—H. G. T.]

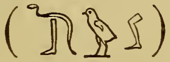
Mr. Cheyne has also favoured me with the following valuable note on זבל, as interpreted "height" rather than "habitation" (p. 5), in confirmation of his views expressed in his work on Isaiah, vol. ii. 155:—

Two things seem clear—1. That זבל is an almost forgotten Hebrew root; in Gen. xxx. 20, the writer selects an alternative root זבד (itself almost confined to proper names) to illustrate זבלון. 2. That זְבֻל was specially applicable to the heavenly or the earthly היכל of יהוה. (1) justifies us in expecting some light from Assyrian ; (2) in presuming some idea suitable to a palace. I suppose most of the houses at Jerusalem were low, and the אַרְמֹנִים would domineer over them, and above all the Temple ?

Of course, a vague sense like "habitation" may just do. But I do not see that it has any *greater* claim, at any rate, than "elevation" ; it looks, indeed, very much like a guess. One may no doubt quote 1 Kings, viii. 13, and say that זְבֻל is parallel to לְשִׁבְתְּךָ. But בֵּית זְבֻל may quite as well be parallel to מָכוֹן (לְשִׁבְתְּךָ applying to both equally), for מָכוֹן itself is a word specially set apart for the heavenly as well as the earthly היכל (in passages where מָכוֹן occurs). Of course, מָכוֹן is not vaguely "habitation," but something firmly founded. I have no fresh light to throw.

I gathered from Sayce that, though Guyard's evidence was not all equally sound, the main part of it was sound ; he himself accepted the result.

[See Cheyne, *Isaiah* ii. 155, where the opinion of M. Stanislas Guyard is quoted with regard to the root *zabal* in Assyrian.

It may be worthy of notice that Pierret gives in Egyptian (on the authority of Brugsch) *tsebu* () "cf. ϫⲱⲱⲃⲉ, *transcendere, superare, elevare, extollere*" (vocab. 726), and notices (p. 739) that ϫⲉⲃ is *acutus*, whence ϫⲉⲃⲏⲗ, *jaculum*. Possibly a common root may have existed at the bottom of these words and *zabal*.—H. G. T.]

The Rev. Robert B. Girdlestone, Principal of Wycliffe Hall, Oxford :—

At your request I put down a few annotations on the interesting paper which you are to read on the 16th.

1. With regard to names personal and local. I do not know whether the Balkh, and the Balkan Mountains, or Wallachia, might be compared with the name Belka [*not* Wallachia, which is akin to Wales, &c., *see* Taylor, *Words and Places*, 43.—H. G. T.] ; but I should like to call attention to the names you afterwards introduce, viz., Sihon and Eglon. They both end in *on*, but *on* sounds local rather than personal ; witness the rivers Pison, Gihon, Jordan, Kishon, Kidron, Arnon ; and the places Ekron, Ænon, Aijalon, Ascalon, Maon, Beth-horon, Chesalon, Ezion, Gibeon, Hebron, Hermon, Sirion, Ijon, Lebanon, Sidon, Zion. Compare also Marath-on, which answers in meaning, I suppose, to your own dwelling-place West-on. The names in the new Palestine map have often dropped this termination.

[I am glad Mr. Girdlestone has mentioned Marath-on, which should be compared with Marath-us, and, as I think, Ma-Mortha or Morthia (name of Shekem), and probably Marath-esium in Ionia ; all derived from Martu ?—H. G. T.]

2. I do not feel sure that you are right in connecting the names Abram, Amram, &c., with the god Ramu. The true God is called מָרוֹם in Is. lvii. 15, Micah vi. 6, and Ps. xcix. 2, cxiii. 4, cxxxviii. 6. This fact suggests the origin of such names as Adoniram. Abram's name, I venture to think, means "exalted father," and when it was changed to Abraham we must look,

not to the Assyrian *rahimu* (רחם), but to the Arabic raham (רהם, رهام) which signifies *multitude*.

[As to Ramu, compare my remarks on Tob, &c., p. 4, and the definition given by Hesychius. Mr. Girdlestone mentioned to me the other day the very curious parallel of *mo-rimo*, a word used in a vague way by the Bechuanas on the Kuruman river for some upper power, and rescued by Dr. Moffat for use as the name of the true God, as it now stands in the Sechuana translation of holy Scripture. It was an exotic word and seemed equivalent to the מָרוֹם cited by Mr. Girdlestone from Isaiah, &c., Mo- in the Sechuana word being a prefix.—H. G. T.]

3. Ahiman is connected by you with "manu." It is observable that the same name is given to a temple-porter after the Captivity, 1 Chr. ix. 17. Would a Levitical porter fresh from the Babylonian Captivity be named after the Babylonian god of fate? I doubt it; and I prefer the old derivation. [It is curious to find among these porters *Talm*-on and *Akhiman:* comp. two of the sons of Anak, *Talm*-aï and *Akhiman*.—H. G. T.]

4. I am inclined to quarrel with you for your suggestion concerning Melchizedek, and I know not by what authority you call *zebul* a height rather than a habitation. [See Cheyne, *Isaiah*, vol. ii. 155, and Mr. Cheyne's remarks above.—H. G. T.]

The name Bath-sheba I should connect with the secondary meaning of Sheba—an oath—rather than with the primary. Your reference to Aziz reminds me of Azaz-el, the so-called scape-goat. Comp. the name Azaz in 1 Chr. v. 8, and the names Uzza, Uzziah, Uzziel, &c.; see also Ps. xxiv. 8, where Jehovah is called עִזּוֹז; also note the expression in Daniel—"the god of Forces" (Dan. xi. 38). Was the Nabathæan Aziz a god, or an attribute? [a "divinity of Syro-Phœnician origin"—Pierret, *Petit Man. de Mythol.*, 100]; and may not the same question be raised concerning Ram, Zedek, and other so-called gods? [Zedek (Sydyk) took to wife one of the Tanides, and his son was Asclepios. He was one of the two who found out the use of salt. So says Philo Byblius. See Lenormant, *Les Origines*, &c., 541, 545.—H. G. T.]

5. On p. 9 you refer to Sekhem. What is your objection to the traditional spelling Shechem, and to the topographical and descriptive sense *shoulder*, or nape of the neck between the shoulders, so applicable to the position of Shechem. Your reference to the Egyptian meaning of the word adds new interest to Gen. xlviii. 22; where see the rendering in the LXX. [I do not know that we are tied to the diacritic point. Dr. Ebers writes (*Æg. u. d. B. Mos.*, 231): "We hazard a comparison between the Egyptian and the Samaritan Sechem, שְׁכֶם, *Συχέμ*, ⲤⲒⲔⲒⲘⲀ, which, as Ewald has already proved, possessed an old-Canaanitish population, who adhered to Baal Berith." As to spelling, I like kh, for it avoids the risk of the soft *ch* in the mouth of the reader, as in French. It is Dr. Ebers who compares the Egyptian Pa-sekhem. I was familiar with Dean Stanley's "shoulder" of the mountain, but it is worth while to consider the alternative of "sanctuary," as in Egyptian: see my paper on "Joseph," *Tr. Vict. Inst.*, xv. 86.—H. G. T.]

6. With the Kheta compare the Chatti referred to by Tacitus, and the Χετταῖοι of Strabo. What is the origin of the name Hit on the Euphrates? [The Chatti, or Catti, are said to have taken their name from "the old German word *cat* or *càd*, 'war'": see Smith's *Class. Dic.*

The Kheta seem to owe their name to the word *Kheth*, an inclosure (fenced or fortified), comp. the Egyptian *Khetam;* and *Khatem*, which is the *ring* for the finger, in Heb. חותם. The well-known site, Sarbut el Khâdem, in the Sinaïtic peninsula, owes its name (says Dr. Ebers) to the old Egyptian fortress (Khetam): *Durch Gosen.* 574. The archaic Hebrew, Phœnician, and Moabite form of the letter ח (Kheth) bears witness to its origin in the ground-plan of a square fortress.

Mr. Gladstone identifies the Kheta with the Keteioi of the Odyssey (*Hom. Synchr.* 175), but I cannot answer for the Khettaioi of Strabo.—H. G. T.]

7. You remark (p. 11) that the names in Scripture may be Hebraised. I suppose they have been, from Adam downwards, unless Hebrew may be taken as a fair representative of the one primæval language, an idea which few would accept.

[I cannot at all agree with this sweeping supposition, for I think that the foregoing paper itself supplies many names alien to Hebrew which have been little altered; in some cases barely transliterated.—H. G. T.]

8. (p. 14). You refer to Sheshak. Compare the theory of Brugsch as to the Assyrian origin of the name Shishak.

9. Your remarks on animal names are very modest and cautious. Could you not suggest a learned inquiry as to a *totem* system amongst ourselves? Think of the hundreds of animal names that we possess, such as Pigg, Hogg, Wolf, Lyon, Deer, Sparrow, Bird, Nightingale, Partridge, Dove, Drake, Wildgoose, Fish, Sprat, Pike, Carp, Herring, Mackrell, &c. &c. What a mine for the investigator!

But, seriously, there is a very interesting question connected with animal names, and having an important bearing on the history of language. Did animals give names to attributes, or attributes to animals? We read in Gen. ii. 19 that God "brought the animals to Adam to see what he would call them, and whatsoever Adam called any living creature that was the name thereof." Turned into plain English, what does this mean? is it that there is a correlation between sight and sound, and that our first parent, by a quickened instinct, was prompted to utter a distinct articulate sound answering to the special features or peculiarities of each object presented to his eye? or is it that each object suggested some marked attribute and was named after it? Thus the question arises: Whence did Adam derive the names of the attributes? I am inclined to think the first alternative the true one—that animals and other sensible objects received names from Adam, and that each name thus instinctively given originated the verbal, adjectival, and other forms. It would be interesting to test this theory by an examination of the Accadian and other primæval languages. Pardon the hastiness of these annotations, and accept my thanks for your paper, and especially for your suggestive remarks on the name Mary.

The Rev. A. Löwy, an eminent Orientalist, well known for his noble exertions on behalf of the outraged and oppressed Jews abroad, has kindly given me the following notes :—

You take "*ram*" as the name of a deity : in that case you have to explain the frequently recurring name "*Joram*" or "*Jehoram*." It seems to be a much simpler method to regard *ram* as a eulogistic epithet, just as *Joezer* (Jehovah is a help) or *Jonadab* (Jehovah is a liberal [bestower of bounties]), &c. (p. 4). *Tob* and its opposite *r'a* do not strike me to be divine titles. *Tubiel*, *Tobiah*, are eulogies of the deity in the same way as *Tobal*. "*Ahira' ben Enan*" bore a name of dispraise, and reminds one of the biblical phrase "*ra' ayin*" (an evil eye), Prov. xxiii. 6, and xxviii. 22.

There are many instances that men and families assumed, defiantly, a name of reprobation to suggest that the individual gives the *dementi* to the badness of the name. For example, in Italian—*Malocchio*, *Malvoglio*, &c.

I have been interested in your combination of *Baal* and *Bosheth*. The latter, denoting "pudor," appears as the female goddess by the side of Baal, and is sometimes used as a synonym; see Jerem. xi. 13, "According to the number of the streets of Jerusalem have ye set up altars to *Bosheth :* altars to burn incense unto Baal" (the English authorised version has misrendered the word *bosheth*, and given the clumsy translation "that shameful thing").

The change of *Jerubaal* into *Jerubosheth* (2 Sam. xi. 21) and *Mephibosheth* into *Mephibaal* is another illustration of this synonymy, but there is in the Bible a tendency to convert Baal (=Lord) into the less dignified form *Bosheth* (=shame or disgrace). See in regard to the aversion to the name of Baal *inter alia* Hos. ii. 19 (in the authorised version, ii. 17).

[Bes is identified with Set (=Báal) in the Ritual (see Pierret, *Dic. d'Arch. Eg.*, also id. *Petit Man. de Myth.*, 131), and wears the "skin of a lion, entirely concealing his face, and giving it a Gorgonian appearance" (Birch in Wilk. *Eg.*, iii. 148), and Bast is the feminine Bes, and equally lion-faced. Also, Set is a lion (solar animal) with eagle-head (solar bird). This is the gryphon of Set or Ba'al.

The festival of Bast at Bubastis (still called Tell Basta, the Pi-Beset of the Egyptians and of Ezek. xxx. 17) seems, by the account of Herodotus (ii. 60), to have been of a kind to entitle Bast to the stigma of the Hebrew Bosheth. I am much interested to find the identification of Bosheth with the feminine Ba'al (=Bast) confirmed by Mr. Löwy. The Amu were assigned to Bast, as their tutelary deity, by the Egyptians.—H. G. T.]

The CHAIRMAN (the Master of the Charterhouse) said :—I am sure you will all desire that I should tender the thanks of the Institute to Mr. Tomkins for the very interesting paper he has just read. It ranges over a multiplicity of subjects—every name affording an opportunity for a separate discussion ; and I am certain that all of us have admired the manner in which the author has condensed so much matter into so small a compass. As one reads this essay, one's attention is called to the very great events and the very startling coincidences to which it refers, and which some of us may, at some future time, be able to follow up. But, of course, the discussion of such a paper as this can only be entered upon by confining one's self to one or two of the particular points which have been raised by the author, and which will probably be found to give quite sufficient opportunity for a very interesting discussion. I may say, speaking from my own point of view, that the general idea which is apt to strike one on perusing a paper like this is, how remarkably Scriptural names and events are continually leaping up in the discovery of those grand antiquities which, as the writer has shown, the researches of antiquarian explorers are constantly bringing to view—relics which tend to throw a great deal of light on names and subjects that have hitherto been a matter of difficulty to the Biblical student. What is an extremely striking part of the paper is that which relates to the Hittites, because this was one of the instances in which imperfect knowledge, giving rise to rash conclusion, aroused objections against the Scriptures with regard to the historical statements they contain—statements which, on further research, we find have not only been justified, but on which modern discoveries have thrown great light. We find with respect to that remarkable people, the Hittites, widely spread as they were—that these discoveries very clearly prove that names, which at first seemed to be unimportant, have been found by the comparisons they suggest, and in other ways, to furnish most important evidence as to the veracity of the records contained in the ancient Scripture history. We observe, too, that these names are connected with the higher attributes and moral virtues we are accustomed to admire. This is the more striking, because sometimes it has been supposed that all these names were simply derived from the heathen gods; but in this paper it is shown that in some cases the names of the heathen gods and goddesses were derived from the attributes which the gods themselves possessed. This makes us think of the origin of pantheism. Probably the first idea of a god was derived from some great truths connected with, and symbolised by, the heavenly bodies. It is not simply that persons looking at those bodies, regarded them as very striking objects, and therefore proceeded to worship them; but, as the investigation goes on, we discover that the myths or legends that have been connected with the heavenly bodies are associated with something symbolical and deep in reference to the motions of the earth and to the stellar system, and also with the moral attributes and physical virtues and strength of human kind. In this way we may go back to the fact that the first notions of religion which God was pleased to give to man were more pure and more widely separated from the worship of many gods which afterwards took possession of the world. We thus are able to see how religion was gradually perverted into the worship of a number of gods, supposed to exercise powers and attributes which, after all, belong only to the one Supreme Governor of the earth. This is what Scripture represents with regard to the origin of polytheism, and the very names that are thus shown to be connected with the attributes of the divine power, seem to confirm what we learn from the Biblical source. We know very well, as the author of the paper has mentioned, that at one time, at a later stage of pantheism, it was the custom to worship the moral virtues, such as were symbolised in the well-known Temple of Concord, and in the other temples and altars which we find in the later periods of Roman idolatry erected to Pietas and Fides, and so forth—the moral attributes in that later stage being personified and made into deities. This is an illustration of the same kind of process; and, as the author of the paper remarked, there are one or two traces of this in remote antiquity, which shows that the attributes of virtue and strength were by the pagans identified with separate beings by whom they were supposed to be personified—those beings being constituted into distinct divinities, representing what really from the first were revealed as the attributes of the one true God. (Hear, hear.) These few thoughts have occurred to me in considering this paper; but it is one that is so fruitful of subjects for reflection, that I am sure those who have heard it read must have had many other thoughts suggested to them, and it is now open to any one wishing to do so, to express his opinions upon any of the points that have been touched on.

Mr. W. Griffith.—The learned lecturer has traced many of the words he has mentioned to an Egyptian origin. He referred to the word "Asir," and connected it with "Osiris," another form of the Hebrew עשיר, the enricher. The readers of our great epic poet may remember the lines :—

> "Nor did Israel 'scape
> The infection, when their borrow'd gold composed
> The calf in Oreb; and the rebel king
> Doubled that sin in Bethel and in Dan."—Milton, b. i.

The calf, Apis, was the emblem of, or sacred to (Diodorus, and Strabo, b. xvii.), Osiris, and Egyptian worship was repeated in after-times in Jewish history. Another etymology quoted by the learned lecturer was that of "Bath-Sheba." Here I differ from him and agree with Mr. Girdlestone that the word "Sheba" is derived from "Sheba," an oath, rather than from the words "Sbat" and "Seb," and for this reason we find "Beer-Sheba," the well of the oath—the well at which Abraham entered into covenant with some of the surrounding tribes. If, then, we have "Sheba," signifying oath, and "Beer-Sheba" meaning the well of the oath, it seems that we have ground to say that "Sheba" in "Bath-Sheba" would also be of the same origin. Another interesting word that has been cited is the word "Sekhem," which means "possession." Being a barrister, I have been struck with the appropriateness to time and place of the juristical ideas which occur in the Book of Genesis. There is no doubt that that history does to a legal mind recall the period of what we may call the law of Nature when possession seems to have been, to use a homely phrase, nine parts of the law—before society was definitely formed and stable. And so we find that when the different wells were built the different tribes took possession and thus came to have property in them. The well "Beerlahairoi," concisely tells the history of Hagar's desertion by her husband (Gen. xvi. 14). The wells "Esek, Sitnah, Rehoboth," show the non-contentious disposition of Isaac (Gen. xxvi. 17–23). Sir William Blackstone, in his Commentaries on the Law, shows what primitive legal ideas prevailed in those ancient times.

There are numerous words from the Egyptian which seem to have left traces in the Hebrew Scriptures. I would call attention to the Egyptian name of Joseph, "Zaphenath-paaneah," which, in Egyptian, signifies the "Saviour of the World." But to pass on from the Egyptian times we should expect that, as history progresses, the names would correspond to the periods coincident in surrounding nations. In Numbers we find the name of Pethor, from פתר to expound ; it seems to be reproduced in "Patræ" of Achaia, and "Patara" of Lycia, and as an epithet of Apollo, the god of oracles, in Horace, *Odes* III. iv. 64. Some of the most striking coincidences are furnished by the Phœnicians, who constituted undoubtedly one of the most commercial races of ancient times. From Carthage they spread their commerce all over Europe, and we ought to expect to find some traces of the Hebrew language being carried by the Phœnicians to the different countries with which they traded. We have the celebrated name of the god Moloch held up to detestation by a poet greater than Homer or Virgil :—

> "Moloch, horrid king, besmear'd with blood
> Of human sacrifice and parents' tears ;
> Though, for the noise of drums and timbrels loud,
> Their children's cries unheard, that pass'd through fire
> To this grim idol."

We find traces of the root in the Carthaginian god Malchos, and in the name of their celebrated general Hamilcar. The father of Greek poetry, in the fourth book of his *Iliad*, line 8, sings of Ἥρη Ἀργείη καὶ Ἀλαλκομενηῒς Ἀθήνη. The epithet ἀλαλκομενηῒς (the irresistible) is, according to some critics, given to Athene as the guardian goddess of a city of that name, founded in Bœotia by the Phœnicians. If so, they probably borrowed the name from the Hebrew (Proverbs xxx. 31) אלה אלקום. Baal, which, in Hebrew, signifies a ruler, and was the name of the false god of Ahab, may be discerned in the Carthaginian "Bal," god (Servius on the *Æneid*), and also in the last syllables of "Hannibal" and "Hasdrubal." Cornwall, whence the Phœnicians obtained tin, the country of promontories, is by some connected with the Hebrew word קרן. The word "Malchos," which has been mentioned, suggests the names of other gods and goddesses.

> "With these in troop
> Come Astoreth, whom the Phœnicians call'd
> Astarte, queen of heaven, with crescent horns."

Whether it is possible to connect Astarte with Eostre, the idol of the ancient Germans, from which Easter, the festival, is said to be derived, is a problematical question; but I think there can be little doubt that the Astarte of the Carthaginians was connected with the Ashtoreth of the Scriptures. Passing on to a later period of history we ought to find many traces of these Hebrew names in the history of Babylon and Assyria. The word Babylon itself connects us with very early times if we look for its derivation. Of course two derivations are given—one is "confusion," and the other makes it the gate of the god Ilu; but, whichever is adopted, it certainly connects the histories together. In Jeremiah, l. 2, the Prophet plays with the names Bel and Merodach:—"Bel is confounded; Merodach is broken in pieces." In the Book of Ezra a number of Persian proper names, expressed in Hebrew characters, are found sufficient to enable the philologist to compose comparative alphabets of the two languages. I have but culled a few proper names from a few of the books of the Old Testament. But the fortuitous coincidences which may thus be shown between the statements of the sacred historians and other histories corroborate the truth of both. It is to be wished that some writer would take as a model Paley's *Horæ Paulinæ*, and compose a similar work upon the Old Testament. Broad, obvious, and explicit agreements would prove little; but a plurality of examples would convince the incredulous, and the minuteness, circuity, or obliqueness of the undesigned coincidences would establish the genuineness of the writings and the authenticity of the narratives.

Mr. HORMUZD RASSAM.—I feel that I am labouring under a disadvantage after the learned lecture we have just listened to, and, therefore, anything I may say will necessarily be of a superficial character. In the few remarks I wish to offer I will endeavour to connect the past with the present usages in the land of the Bible, because, knowing as I do from my travels and the discoveries I have made, I think every one, either in this or any other country, will be able to comprehend more forcibly the truth of the Bible by merely riding through the country and examining the languages of the different races, and seeing the marvellous connexion which still links them with each other. With reference to the question of Biblical names, we ought to remember that, with very few exceptions, all the Semitic languages, such as the Hebrew, the Chaldean, and the Arabic, contain words which have a meaning; and it is very remarkable that, if you begin with Genesis and end at the old dispensation, we shall find that every name has a connexion with an attribute of a God, whether it is connected with idolatry or the worship of Jehovah. It is the same way in the present day amongst the different nationalities referred to. We must take into account the three distinct sects which exist in the East, and which have occupied a conspicuous position in regard to the inspired Book. I allude to the Jews, the Christians, and the Mohammedans. Amongst these nationalities we find that in most cases every person is named according to the tenet of his sect. Amongst the Christians, men and women are named after their saints; the Jews take their names from the Pentateuch or the Prophets, such as Isaac, Moses, Daniel, and other holy men ; and the Mohammedans are named after their Prophet and saints, and also after some attribute of God, of which there are no less than a hundred. In the case of the latter, for instance, we have Abd-Alhameed, the name of the present Sultan of Turkey, which means "the slave of the Praiseworthy"; and the name of his late father was "Abd-Almajeed," or "slave of the Glorious one," while the name of his uncle, the late murdered Sultan, "Abd-Alazees," means "the slave of the Precious one." Whether we go to the centre of Africa, Central Asia, or the Arabian or African Sahara, we shall find amongst the Moslem races names such as these I have mentioned ; but the Bedouin Arabs are sometimes called after animals, the heavenly host, or take other fancy names. There is also the name of "Mariami," which the learned lecturer mentioned, which means "my Mary," and is even now in common use, and appreciated by the females. With regard to the different definitions given to the name of Abraham, I need not remind you that the Bible has been very often assailed, especially in these latter days, and many excellent Christians have unwittingly (without reflecting whether such interpretation is confirmed or sanctioned by Holy Writ) preferred the explanations of the so-called scientific and learned men of the world for the meaning of Biblical names and mysteries, against what we are plainly shown in the Bible. As far as I am concerned, I have always found the Word of God, after no end of assaults, to shine forth with greater brilliancy and truth, and exhibit to us the right understanding after all. It will be found, whatever scientific and literary men say to the contrary, that Abraham means the exalted father, as "Ab" means in the Hebrew and other Semitic languages, father ; and "ram" high or exalted, which word is in Arabic an attribute of God. Then again as to the word of Beersheba or Bethsheba, I would prefer the Word of God before any other saying or writing. We have been told that "Sheba" means seven, and so it is, but the Bible tells us that it means "oath," and such I must take it, especially as it is understood in this sense in Hebrew. We now come to the word "Babel," which has always been understood by Christians, Jews, and Moslems, as derived from the word "confusion"; and the Bible tells us plainly that this is the meaning of it, but nowadays we are made to believe that the real meaning of it is the "gate of God," derived from "bab," gate, and "El," God,* because, forsooth, these words have been discovered in some cuneiform inscription; and even the late Dean Stanley followed that anti-Biblical belief, by quoting this error in his *History of the Jewish Church*. Well, I ask you, gentlemen, would it be right to take that interpretation before the Word of God, seeing that if you go amongst the Arabs, who know nothing about the Bible, and ask them what "Babel" means, they will tell you that God had confused the tongue of the people of old, and that was the reason the monument of the first unbelief was called "Babel"? It is very remarkable that in the time of Nebuchadnezzar the Jewish names of Daniel,

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* "Bab" has the same meaning in Arabic and Assyrian, and EL is the same in Hebrew, Chaldean, and Assyrian.—H. Rassam.

Hananiah, Mishael, and Azariah, were changed into Belteshazzar, Shadrach, Meshach, and Abednego,—which custom prevails up to the present day amongst the different communities which inhabit that country.* If a Christian becomes a Mohammedan, his name has to be changed, even if he is called Georgis (George), which is regarded as that of a saint, both by Mohammedans and Christians; and so if I became a Moslem my name would be changed, though I bore a name acceptable to Mohammedans. So with regard to the conversion from Islamism to Christianity, though the person's name would be Abd-Allah, Abd-Alkareem, or Abd-Arraheem, all of which are attributes of God, with the "Abd" (slave) added to them, they would be changed to the name of a saint. Moses is considered by the Moslems next to Christ and Mohammed, and they call him "Kaleem Allah" (speaker with God,) yet if a Jew is named after him and turns a Moslem, Moses would be changed to Mohammed, Ali, or some other name implying a connexion with them. To show you how cautious a man must be in giving an opinion about the derivation of some words as they were used two or three thousand years ago, I will give you some illustration of some extraordinary coincidences that have come to my knowledge in the meaning of words. Of course, people must live some years in the country to know what many of these words mean. We have the word "telegraph" in Mesopotamia, as the telegraph system has been introduced into that country as well as in some other parts of the East. If you go, therefore, amongst the Arabs of that country and ask them what "telegraph" means, they will tell you that it means "to know by wire," because it happens that in *their* Arabic "tel" means wire, and "araf" to know or expound. The meaning of "telegraph," therefore, amongst these people is "to know by wire," or to obtain "knowledge by wire." So if Europe were to be destroyed and Arabic would be the only language extant, an Arab scholar might just as well give it as his opinion that the word "telegraph" was derived from the Arabic words "tel" and "araf"! I must also relate to you a very serious mistake which was made by a friend when we were guests of an Arab chief by not being able to pronounce the guttural kkaf or k properly. The chief had killed a sheep for us, of which a sort of stew was made, in which the head, the trotters, the liver, the heart, and other parts of the animal were mixed up together. It is considered polite amongst the Arabs, when a party is seated together, for one to offer the other the nicest thing in the dish; and so my friend, for civility's sake, picked out a bit of the heart and asked the chief if he would take a piece of that "kalib." Now, in Arabic the words "heart" and "dog" have the same pronunciation, with only this difference, namely, that the first letter of the word, k, must be pronounced more guttural in the word which means *heart;* and any one who cannot make the proper sound would be certain to say *kalib* instead of *kkalib*; that is to say, *dog* instead of *heart.* You can well fancy, then, how disgusted our

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* We see also in Genesis, xli. 45, that, in taking Joseph into his service, Pharaoh changed his name into "Zaphnath-paaneah."—H. Rassam.

Arab friend was in having been asked to partake of a bit of a dog! But I soon set the matter right by explaining to the pious Moslem the unintentional mistake. Mr. Tomkins has alluded to the discoveries I have been enabled to make amongst the ruined cities of the East. I am sorry I cannot, for the present, say much about what I have recently been doing, or I should have given you here, before this, an account of my discoveries. Indeed, with one exception, I have not much to tell you beyond what I stated in my lecture two years ago. I will, however, offer you a brief statement of what I have lately discovered. In the beginning of last year, while I was going about seeking for old ruins, as you know I am always doing, for the purpose of discovering something more of the old cities that lie buried there, I met an Arab who told me that he knew of an old ruined city, the remains of which were to be found within four hours' journey of Bagdad,—that is to say, about twelve miles, taking the computation at three miles an hour. As I never refuse to act on any information likely to prove useful, I said I would go with him to the place indicated. I therefore accompanied him, and while we were riding along the route pointed out by my companion we came, at a distance of five hours from Bagdad,* upon an old ruin of a great magnitude, which I had not seen before; so large was it that it must have been, indeed, three miles round. I at first thought that that was the place of which he had spoken, so I said to him, "Oh! this is the place." He replied, "No; this is not the place I told you of; it is further on." I then asked, "What is this place?" He answered, "I do not know." However, I made up my mind that I would certainly explore it when I returned from the other pursuit. We then proceeded onwards, and at length the Arab brought me to the site, which had a most wonderful ancient Babylonian wall. I at once set to work there, but found nothing of any value, and soon afterwards went back to the place I had first seen, and commenced a thorough search. The result was that after digging for four days the workmen came upon the top of some walls, which were found to belong to an extensive ancient building, in which we soon began to find inscribed objects and other relics. I may here remark that I am not an Assyrian scholar. I am only a discoverer of Assyrian antiquities, which I send to the British Museum to be deciphered by those who have made Assyriology a study. We first of all discovered four rooms, and then we came upon a fifth. The first four rooms were paved in what I should call the Assyrian or Babylonian style, *i.e.*, with bricks or stone, but the fifth was paved with asphalte, the discovery of which brought to my mind the saying of Solomon that "there is nothing new under the sun." As this seemed to me a very singular discovery, I ordered the breaking up of the floor, and after we had dug about three feet into it we were rewarded by the discovery of an inscribed terra cotta coffer, with a lid over the mouth; and on taking off the cover we found therein two terra cotta inscribed cylinders and a stone tablet, minutely inscribed, with a bas-relief on one side of it. These relics have been found to be the most important records of the oldest city in the world, known to the Greeks by the name of Sippara, and mentioned in the Bible as "Sepharvaim" (2 Kings, viii. 17, and xviii. 34, &c.). The ancient historians tell us that this city was founded by Noah (who is called Xisuthrus) after the Deluge; and according to tradition it was here that Noah buried the antediluvian records. (Applause.) Soon after I had discovered this new city, I had to come home; but I left some workmen under trustworthy overseers to continue the explorations at that place; and I have been informed, since, that they have uncovered some more rooms, in one of which they found a channel built with bricks, inside which were buried nearly ten thousand tablets, some whole and some broken. These, I hope, will soon reach London. (Applause.) We cannot, of course, say, as yet, what they contain, but it is quite possible that they may be found to record something of even greater value than anything of the kind that has hitherto been discovered in the course of our researches. I shall be happy to give you further information concerning this very interesting discovery after I go out and return again. I hope to be able to go out to Mesopotamia after another month, and then I trust I shall be able to make a still further advance upon what has already been brought to light. (Applause.)

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* On this journey I was not proceeding from Bagdad to visit these ruins, but I was out travelling in Southern Mesopotamia, and going towards the city of the Califs.—H. Rassam.

Mr. W. GRIFFITH.—The mention of the word recalls a passage in the old Testament in which the decree of Cyrus for the restoration of the Jews was said to have been discovered in a coffer or earthen vessel (Achmetha) by Darius.

Mr. RASSAM.—Yes, in Ezra.

The Rev. H. G. TOMKINS.—With regard to the words "Bath Sheba" and "Beer Sheba," I think Mr. Rassam has not apprehended my point. The word "Sheba" means "Seven," and the "oath" was celebrated by burning seven victims, or the cutting of a victim into seven parts; so that the word "seven" underlies the oath. My point was that Sheba was a numerical symbol of a god; but before it came to mean an oath it meant seven—seven being the numerical symbol of a god.

Rev. H. A. STERN, D.D.—It affords me great satisfaction to follow Mr. Rassam. We have followed each other in many places, that were not very pleasant, but I am delighted to do so on the present occasion. Now, as regards the subject before us this evening, no one who reads the Bible carefully can doubt that many of the most distinguished names were bound up with important tribal distinctions, with certain localities, and with the worship of the true, and the worship of false gods. Thus the progenitor of the Jewish people is designated "Abram the Hebrew." In Egypt, Joseph is continually called by that name. Now, the family of Abram at that early period could not have won a reputation that rendered their nationality familiar in a land considerably removed from Egypt. *Ibri*, from whence the word is derived, does not signify a Hebrew, but a stranger, a pilgrim, a foreigner, one who comes from a far country. This, to some extent, accounts for the condescending reception accorded to Joseph by Pharaoh, who was himself a Hyksôs, or foreigner, one of the last of the Shepherd Kings. The mixed multitudes that came with the Jews out of Egypt are designated "*ereb rab*," which the Targum Onkelos correctly renders "*nuchrāin*," strangers. In the interesting paper, to which we have just listened, reference is made to the name of Baal and Bosheth, and I was glad to hear Mr. Tomkins say that he took these names for two distinct deities. This the Bible plainly corroborates. It is only necessary to examine the passages, where Baal and Bosheth are mentioned, and the distinction is evident. Baal, like Bosheth, it is true, has in many passages in the Septuagint the feminine article; hence Biblical critics come to the conclusion that ἡ Βάαλ and ἡ Αἰσχύνη are one and the same deity. They overlook the well-known fact that the Greeks were fond of representing everything in the moral and religious life under that form. The statements in the Bible clearly indicate a notable distinction. I will only advert to one or two. In Jeremiah, xi. 13, it is said: "For according to the number of thy cities were thy gods, O Judah, and according to the number of the streets of Jerusalem have ye set up altars to *Bosheth*, altars to burn incense to *Baal*." Again in Hosea, ix. 10, "They went to Baal Peor, and separated—literally consecrated—themselves to *Bosheth*." In Ezekiel there is an allusion to *Bosheth* under the name of *Pi-beseth*, *Bubastis*, mouth of the *Bosheth*. *Bast* and *Bosheth* involve merely the interchange of a dental letter, which, in the Hebrew, is of frequent occurrence. Now *Bubastis* was a goddess of the Egyptians, whom Herodotus compares with *Diana*. She was worshipped under the form of a cat, to which the prophet appropriately refers, when he declares "*Bosheth* hath devoured the labour of our fathers," &c., &c. There were festivals held in her honour, which correspond with those accorded to the *Ashera* or *Ashtoreth*, the *Venus* of *Phœnician* and *Aramean* mythology, whom, in every respect, she closely resembles. Thus the reference in the Bible to *Bosheth*, *Besheth*, or *Bast* of the Egyptians, indicates a far more corrupt and debasing worship than that offered to *Baal* (without any adjunct), the supreme divinity of the *Phœnicians* and Canaanites. Of course, there are other names mentioned in Mr. Tomkins' instructive paper, which deserve serious consideration, and I hope some members of the Victoria Institute will, on a future occasion, again take up the subject.

Rev. J. FISHER, D.D.—I had marked two words which I wished to notice, but they have already been so fully referred to, that I hardly need go into that part of the subject. I may say, however, that one of them was "Abram." I do not think this name comes from "Ramu," but from "Ram," high, and that God changed it to mean "the father of a multitude." The paper, indeed, hints that it was perhaps changed because it was half-heathenish. God also changed the name of Jacob to Israel after the wrestling with the angel. With regard to Melchizedeck, I think, according to St. Paul, in the seventh chapter of *Hebrews*, the name does not come from Zedek, the Phœnician god, as St. Paul describes him as "King of Righteousness, priest of the most high God." Nor do I agree with Professor Smith as to the animal names. Mr. Smith gives a number of names, and says they are connected with Totem worship, his argument being that those who used them were Totem worshippers. I can hardly think he is right in this. We know that Jacob gave animal names to his sons on his death-bed—Judah being designated a lion's whelp; Issachar a strong ass; Dan a serpent; Naphthali a hind; and Benjamin a wolf. This, however, has no connexion with Totem worship; and suppose, taking another view, the names common in our own country were to form subjects of comment three or four thousand years hence, any one adopting Professor Smith's argument would be inclined to say that such names as Bull and Bullock, Cow, Hart, Roe, Buck, Hind, Fox, Hare, Badger, Lion, Wolf, Bird, Cock, Hen, Duck, Drake, and so forth, indicated that those who bore them were Totem worshippers. I certainly cannot help thinking that Mr. Smith is wholly wrong in his argument.

Rev. J. W. Ayre.—In the section of the paper referring to "Some other Egyptian Names," I observe the word "Hagar" is referred to as an Egyptian name. Now I have heard it suggested that as Hagar or Hadjar is the Arabic word for "stone," it was translated by Pliny as "petra," and the Romans, not understanding anything about Hagar, gave Arab el Hadjar the name of "Arabia Petræa," so that the name Petræa is really a witness to Hagar. There is a similar instance in the case of the Red Sea, or sea of Edom, where Edom, not being recognised as a proper name, was translated "Red"; and Esau, you may remember, was called Edom ("red") because of the incident of the *red* pottage he received for his birthright. There is also a somewhat similar instance in the case of the sea of Ashkenaz, which by the transposition of a letter became "Axeinos" (inhospitable), the Greeks giving it afterwards another name, Euxine, which, if this genealogy of the word be correct, stands as witness for Ashkenaz, the grandson of Japheth. I must leave it to the more learned to verify these suggested derivations.

Mr. Trelawney Saunders.—I must apologise, and especially to the ladies, for rising at so late a period of the evening. However, I intend to pass rapidly over the notes which I have made during the meeting, and, as I have not come with any prepared discourse, I shall not detain you long. I observe a comparison between "'Aujeh" and "Og, King of Bashan." Now "'Aujeh" means "crooked." I wish to know whether the analogy to be drawn is that the King of Bashan was a crooked man, or hunchbacked? It may be added that the initial letter of both names is the guttural "ain," making their pronunciation "Gaujeh" and "Gaug." Is not the English word "gouge" equivalent?

I now come to the word "am," or "um," as a name of God. This name has exercised very considerable influence, and not only among the ancients. On page 7 of the paper it is said that the form Amon is purely Egyptian. I would here make the remark that the light acquired in recent years on these subjects has been obtained chiefly by turning to the east for interpretation. It is by the uncovering of buried records that so much light is now thrown upon these matters, it is by means of the long-lost riches that have been disinterred in Egypt and Assyria. Perhaps we may now go a step further east with equal, if not greater success, and in so doing we may even find existing among living men, the means of interpreting the remotest antiquity. I allude to Bactria and its surrounding highlands, especially the unsubdued and unknown recesses of Kafiristan. With reference to this word "am," I would particularly call attention to a well-known sentence that is understood, or, at all events, is used rather than understood, in the exercise of one of the most widely-extended religions of the world—I allude to Buddhism. The Buddhist religion has a sentence somewhat equivalent to the famous Arabic sentence, which is a part of the ritual of every Mahommedan. The Buddhist sentence is "Om mani padmi hum." In this sentence the word "Am," or "Om," has been referred to the Deity;* and therefore I should be slow to accept the assurance, even on the part of so learned a man as the lecturer, that the word is purely and wholly an Egyptian word.

The Rev. H. G. Tomkins.—I beg pardon; I never gave such an assurance as that at all. I only traced the word "*Amun*" to Egypt, but I did not say how it came into Egypt. That is part of a very great question.

Mr. Trelawney Saunders.—I look for the origin of the word further east. I am one of those who believe that the origin of the Egyptian language and religion is to be traced much further east than Egypt itself. The late Rev. Alex. Hislop, in *The Two Babylons*, has accumulated evidence of the Assyrian origin of the Egyptian rites. The Bible not only takes us to Babylon, but still further east. The first inhabitants of Babylonia, or Shinar, came from the east of that plain. If we go among the Hindus, and ask them whence they came, they do not tell us "from the east," but they say "from the north-west." One of the most interesting facts communicated to us in those instructive volumes, *The Sacred Writings of the East*, now being edited by Dr. Max Müller, has reference to the origin of the Chinese. The Chinese say they came from the west. Now, let us just for a moment lay down our bearings from these several points. There is the bearing eastward from the land of Shinar; the bearing north-westward from the land of Bramavarta; and the bearing westward from China. Where do these meet? They meet on the Pamir, the Roof of the World, among those mountains that overhang the ancient Ariana, and which I believe to be the original home of the Aryans. The ancient books of the Zoroastrians say that the people of Ariana Viejo, or old Ariana, were driven away by the snow. When the population became too great in the valleys, and could not settle higher up because of the winter snow, they were obliged to emigrate.

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* Some authors translate the sentence thus:—"Oh! the jewel in the lotus, Amen." But others define the Am, Om, or more accurately Aum, as expressing the Trinity of Bramah, Vishnu, and Siva, or Budha, Dharma, and Sanga, indeed the Triune God.—Bryan Hodgson's *Essays*, p. 88. T. S.

Thus we are led back from Egypt to Assyria, and then to Bactria and the Pamir, or the Roof of the World, and Tibet, where we find "Am," the Invisible God, is still worshipped.

Passing to page 5, we are told that "Barzillaï" is from "Barzil." This word stands for "iron" in Hebrew; but as "Bar" is a common word for son, and the other syllable is connected with a root signifying "to pour out," besides contributing to a word indicative of "violent heat," perhaps Barzil came to be applied to iron, because it is poured out with violent heat from a furnace. In the case of Barzillaï, who was one of David's friends, the word is supposed to be expressive of a hard or austere character when applied to a man; but, as applied to the Assyrian God, it seems to receive greater force from the suggested analysis.

My next reference is to "Báal Shalisha." The latter word is said to mean "three." Báal Shalisha is connected with another name, which has been extremely puzzling to me, and that is the "Land of Shalisha." I should be glad if the learned lecturer would only help me to understand why Baal has the attribute of trinity attached to him, or why that particular land should have been the land of the three, and what three. Perhaps we might then understand where the Land of Shalisha is, but up to this time we only know that it is one of the parts visited in the search of Saul for his father's asses.

My next reference is to the word "Maharaï," the name of one of David's valiant men. The Hindus have a ready translation for it. Its Hindu equivalent is "Maha-raj," also the identical word "Maha-Rai," both signifying a great king. Further, "Maharaï" may be traced through various other forms, as "Major," "Mayor," and "More," expressive of the comparative degree.

I now come to "Pi-nehas," only to say that there is another use for the word "nehas," which I cannot just at this moment recall.

The Rev. H. G. Tomkins.—You do not mean "nâchâsh," the serpent, do you?

Mr. Trelawney Saunders.—I am not sure about it. (My desire was to refer to the repeated use of "Nahash," or "Nachash," in connexion with the Ammonites, in the Bible, where the word means, besides a serpent, also an enchanter and a seer. But it is a different word from that which forms part of "Phinehas.") I would, however, in the presence of Mr. Rassam and Dr. Stern, put forward with great diffidence the suggestion I am about to make, that the word does not suggest the meaning of the "negro," as Brugsch has it, but its probable identification is with a term applied to princes in Abyssinia—that of "negus." Thus "Pi-nehas" would mean "mouth of a prince." The accepted interpretation is "mouth of brass."

Here is another curious thing. I do not wish to make you laugh by any reference I may make, so I beg you will be serious. I allude to the word "khafni" ("hophni"), a pugilist. You all know that *aleph*, the first letter in the alphabet, may be pronounced in various ways. Well, then, I would ask why should not "khaf," which means a pugilist, be "khuf," and it is pure English, if you wish to say you mean to deal pugilistically with a man, to assert that you "cuff" him.

The Rev. H. G. Tomkins.—I think it is probable. You know that *kaph* is the hand to smite with.

Mr. Trelawney Saunders.—One of the previous speakers has alluded to the probable influence of Phœnician commerce in the distribution of these Oriental terms. I agree with him; and with reference to the word "Bosheth," the meaning of which is "folly," is it not synonymous with the word we now so frequently use to express "folly,"—the word "bosh"?

The Rev. H. G. Tomkins.—I think that is quite right.

Mr. Trelawney Saunders.—Then we have the word "Babel," which means "confusion." I quite agree with what Mr. Rassam said on that subject, in which I follow the leading of Holy Writ, though I also remember that "Babel" means not only confusion, but that "babbler," which is Johnsonian English, is still in use among us. Of course, I do not mean you to conclude from all this that we are part of the ten tribes, or anything of the sort. Well, then, there is an allusion to the "land of Naharina." This has always been regarded as Mesopotamia, between the Euphrates and the Tigris; but I believe it very seldom, if ever, occurs in that sense in the Bible. Whenever Mesopotamia is mentioned in the Bible, it is referred to the rivers of Damascus; but that is a very questionable point.

Then, again, we have a curious word in "Takhtim-Khodshi." "Takht" is a common word at the present day. On the borders of the Indus you have, looking down from the height of 12,000 feet, the Takht-i-Suleiman,—the Throne of Solomon, which I take to mean the land of the high place.

Upon subsequent reference I find that the Hebrew has no connexion either with "thrones" or with "Kadesh." The latter is spelt with *kaph*, but "Khodshi" has *cheth* as its initial. The words appear to mean a "Reclaimed Lowland," and they are applicable to either of the plains on the borders of the Sea of Galilee. There is some reason to believe that neither of those plains existed at the destruction of Sodom, and their comparatively recent reclamation may have caused the descriptive name of Tahtim Kodshi to be attached to them in the time of Joab.

Then, again, there is an allusion made to the name "Cain." There is a Cain, a city of Judah, which I think is now pretty fairly identified. Upon reference, it appears that the Hebrew initial of Cain is *koph* and not *caf*. The city in Judah is spelt the same as the name of the fratricide. So also is that of the Kenite tribes. In that case the points vary in most passages, but not in all. The city of Kinah only differs in Hebrew in the final h, and the points.

With regard to the word "Totem," I take it to be something which we might compare to-day with patron-saints. It had very much the same sort of meaning and use,—namely, the adoption of an animal as the emblem of the particular god to which the family should look.

At the end of the paper an allusion is made to what has been written by Professor Robertson Smith, to whom we should offer our best thanks for his learned works. I would also say, with reference to the Jews, that, if they have not shown a natural capacity for spiritual religion, they have, at any rate, displayed a great natural capacity in other respects. I would add, with regard to that race, that if we want to understand why they became the chosen people of God, we have only to look round at the present day and see what they have become amongst ourselves. When we remember that it was only as yesterday that one of those people was directing the destinies of this country, and when we find so many of this scattered race occupying positions of great influence and control in so many other countries of the world, I say that we have at this moment evidence of the superior capacity of the Jewish people, if they had chosen to use it in the light in which God had given it to them. But they have thrown God spiritually aside, and they have been thrown over by God themselves; but this has not been for any want of natural capacity, but rather through making too much use of their natural capacity, and forgetting their dependence on God.

Rev. H. G. Tomkins.—My reply to what has been said must be chiefly by way of congratulation on having heard so much, since I sat down, from so many distinguished sources. I have only to defend myself against the imputation of falsifying what St. Paul says about Melchizedek. It is true that St. Paul speaks of Melchizedek as King of Righteousness and King of Peace, but not in the first instance, for it was notorious that Salem was the place of which he was King; and in a similar way St. Paul says he was King of Righteousness; but that does not falsify the primary use of the word "Zedek," and therefore it is not at all illogical for a Christian man to suppose that "Zedek," as a divine attribute, may have been compounded in the name of Melchizedek, just as Salem, which does mean peace in the abstract sense, was yet the name of a place, and was adopted by St. Paul in a secondary manner for his argument. No doubt there are many other points one might follow up with the greatest interest, such as "Aujeh" and "Og," which may have meant the crooked man; but I am not responsible for this. I can only add that what has been said has been extremely interesting.

The meeting was then adjourned.

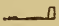
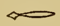
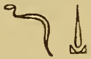
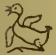
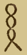
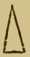
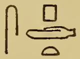
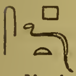
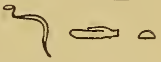
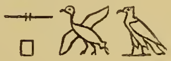
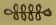
ADDITIONAL REMARKS BY THE AUTHOR.

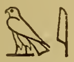
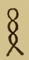
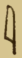
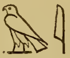
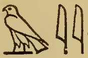
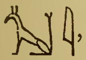
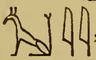
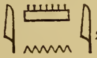
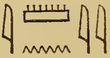
Since the foregoing discussion took place I have received from Professor Maspero a most obliging and interesting letter, of which the former part consists of critical observations on my paper. M. Maspero writes :—

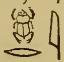
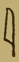
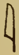
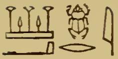
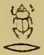
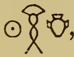
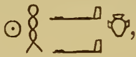
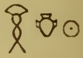
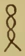
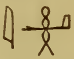
Boulaq, *le* 21 *Mai*, 1882.

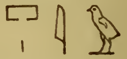
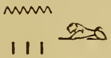
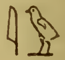
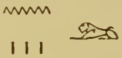
Monsieur,—Vous m'excuserez si je n'ai pas répondu plus tôt à votre aimable lettre : les évènements politiques sont venus compliquer mes occupations journalières et m'enlever le peu de temps dont je disposais. Je

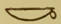
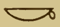
saisis un moment pour vous remercier des brochures que vous m'avez envoyés et vous dire ce que j'en pense.

Le premier mémoire sur les noms bibliques me paraît indiquer une bonne voie. Les hébraïsants rejettent systématiquement l'aide que pourrait leur offrir l'antiquité égyptienne et assyrienne ; en Allemagne ils affectent de mépriser les assyriologues et les égyptologues ; en France, s'ils n'ont pas la même superbe, cela tient aux relations d'amitié personelle qui subsistent entre Renan, Derenbourg, &c., et moi. Votre mémoire si court qu'il soit est utile, et c'est à cause de son utilité même que je vous adresserai quelques critiques. La plus grave consiste à suivre le système de Mariette et de Brugsch, pour lesquels les transcriptions égyptiennes des noms sémitiques sont fautives et peuvent être traitées légèrement. Vous verrez dans le dernier numéro de la *Zeitschrift* une étude sur la liste de Thoutmos, en suite à mon étude sur la liste de Sheshonk, et où j'ai montré combien les transcriptions sont rigoureuses. Pour être à l'abri de la critique, il faut rejeter toutes les transpositions de syllabes, tous les retranchements, toutes les élongations, n'admettre que les transcriptions exactes des articulations correspondantes  ou  pour ע,   pour צ, pour ה, pour ח خ,  pour ח ح, &c. ; sauf dans quelques cas où la substitution dialectale de א à ע, de שׁ à שׂ ou à ס sera prouvée par des exemples authentiques. Cela posé, je n'admettrai pas le rapprochement de la page 5 ספי ou סף avec Sap, le dieu de l'Est de Egypte. Le dieu de l'Est est  *Soupti* aux basses époques,   aux anciennes époques : ספי ne renferme pas le  radical du mot égyptien, ni le suffixe , des noms d'agent. Si vous tenez au rapprochement égyptien, ספי est très exactement   *le dieu Larve*, *Sopi*, une des formes d'Osiris momié.

P. 6. Le nom  n'a pas la valeur א ר ה, le  de Ḥor est un ח, non un ה, comme le prouvent les transcriptions phéniciennes ;  final est la termination patronymique *i*,  var. , *celui qui est à Hor*, Ὡρίων, comme , , celui qui est à *Sit*, ,  celui qui est à Ammon, Ḥor*i*, Set*i*, Amon*i*, Ἀμμώνιος.

P. 7. Hophra, חפרע est distinct de  par le ע final, qui ne saurait répondre au  Khropr*i*, avec la finale *i*  assurée par des transcriptions grecques comme Σαχπήρις de  [*vide* Parthey, *Aeg. Personnamen* 100. H. G. T.].  est un nom d'agent du verbe, le *deveneur*, celui *qui* devient, formé comme Hor*i*, Set*i*, &c. חפּרע est la transcription exacte de , non de , comme le prouve la vocalisation ancienne Οὐαφρῆς, Οὐαφρῆ, antérieure à la ponctuation massorétique,  *Ouh-ab-rî.* De même סיעא ne renferme pas le ח  de 

Pour Bethia, vous verrez dans mon étude sur la liste de Thoutmos III. que je suis d'accord avec vous ; mais je ne vois pas comment   peut renfermer les éléments de Penuel. La texte hiéroglyphique donne פאונר, *Piaounr* ou *Piaounl*, ou mieux *Pioll* ou *Piorr*,  répondant au son *o*, et  à *r* ou *l* sonnante.

P. 8. Il n'y a pas d'exemple prouvé de  = ח. Si *Kofnia* est sémitique, c'est plutôt une racine comme גֶּפֶן *palmes, vitis*, qui répond lettre à lettre au mot égyptien,  = ג comme dans *Magiddi*, *Gargamish*, &c.

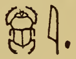
Pour Tii, j'ai eu occasion de montrer dans le *Recueil* que le nom est égyptien de la plus ancienne époque, et que la soi-disant origine étrangère de cette reine est contraire à tous les documents. J'ajoute que la Tii (Dia, Dii) et Shabtouna de la liste de Thoutmes III. doivent être cherchées dans le massif de Juda, non dans le bassin de l'Oronte.

Since writing my paper I had read the important papers of M. Maspero on some names in the lists of Thotmes and Shishak (*Zeit.*, 1881, 119, *et seqq.;* 1880, 44 *et seqq.*), and had hailed with pleasure a more rigorous method of dealing with the question of identification of names than had yet been applied by Brugsch and Mariette. Some study of Parthey's list of Egyptian names from Greek sources had also led me to see the importance of checking transliterations where it is possible by Greek records. Honest students will gratefully welcome the kind pains bestowed by M. Maspero on my tentative and crude endeavours. Sooth to say, I was not quite convinced as to the native Egyptian origin of the fair queen Tii or Taïa on reading the learned Egyptologist's remarks in *Recueil de Travaux*, iii. 127, for is she not represented as blue-eyed ?

To sum up briefly M. Maspero's criticisms on my paper, they are to this effect :—

Page 5. Sapi is probably the Larva-god represented as the mummified Osiris-Sapi, or Sopi (see references in my paper on "Joseph," *Trans. Vict. Inst.*, vol. xv. 91).

Page 6. Hora must be struck out, as not derived from the Egyptian Horus (an oversight of mine), but the others remain.

Page 7. I will not epitomise the interesting note in which M. Maspero objects to the equivalence of Hophra with the Egyptian . It is worthy of careful study.

Si-aha seems to stand as the Egyptian "son of the Moon-god."

I am much pleased to find M. Maspero of the same opinion as to Beth-ia. and gladly accept his correction as to the former elements in Kafeniā or rather Gĕfĕnia, which if a Semitic name may mean "Vine of Jah" (see Gesen. on the use of גֶּפֶן).

M. Maspero objects with much reason to Brugsch's identification of Penuel, mentioned in p. 7. If the reader will revert to the text of my paper, he will be able to assure himself that these acute and learned criticisms do not affect more than a few of my tentative suggestions, and I am the more happy to find that the main line of my inquiry approves itself to so high an authority as "une bonne voie."

ORDINARY MEETING, Feb. 6, 1882.

J. E. Howard, Esq., F.R.S., V.P., in the Chair.

The minutes of the last meeting were read and confirmed, and the following elections were announced :—

Member :—Miss E. Isis Pogson, Meteorological Superintendent and Assistant Government Astronomer, Madras.

Associates :—Rev. F. Chambers, M.A., Oxon, Brighton ; Rev. Canon E. Garbett, M.A., Barcombe ; Rev. W. E. Heygate, M.A., Oxon, Isle of Wight ; J. Kitchen, Esq., London.

Hon. Loc. Sec. :—Rev. W. H. Hobart, B.A., Londonderry.

Also the presentation to the Library of the following Works :—

"Proceedings of the Royal United Service Club."	*From the same.*
"Proceedings of the Royal Geographical Society."	*Ditto.*
"Mikrostruktur der Steinkohle." By Prof. Reinsch.	*Ditto.*
"Philosophie Organique." By Dr. Doherty, Paris.	*Ditto.*

The following paper was then read by the Author :—

*BREAKS IN THE CONTINUITY OF MAMMALIAN LIFE IN CERTAIN GEOLOGICAL PERIODS FATAL TO MR. DARWIN'S HYPOTHESIS OF EVOLUTION.** By T. K. Callard, Esq., F.G.S.

SIR JOHN LUBBOCK, in his Presidential Address to the British Association at York, called attention to the change that had come over the minds of naturalists since the publication in 1859 of Mr. Charles Darwin's *Origin of Species ;* and Professor Huxley, in his discourse on Palæontology, at the same meeting, says, of the hypothesis of evolution, "that the palæontological discoveries of the last decade are so completely in accordance with the requirements of this hypothesis, that if it had not existed the palæontologist would have had to invent it." What is the hypothesis of evolution? It is, that all the higher forms of life (man included) were evolved from some low ascidian form of mollusk through a long line of diversified forms by insensibly fine gradations.*

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* This paper was read during the lifetime of Dr. Darwin.—Ed.

2. Confining my attention to the life of mammals, it will be my object to show the high probability that at certain geological periods there were such breaks in the continuity of that order of life that fresh creations became a necessity, and, if so, as a consequence the hypothesis of evolution cannot be true.

3. Professor Huxley "would not venture to say that it is *impossible* that the multitudinous species of animals had been independently originated by an endless succession of creative acts. . . . . but that it was so astoundingly *improbable* that he felt compelled to adopt the hypothesis of evolution."

4. It is not my intention to-night to discuss the question *theologically*, but I will content myself with saying that, admitting the existence of an Almighty and All-wise Creator, no amount or variety of creative acts is to my mind astoundingly improbable.

5. The doctrine of evolution, like that of the antiquity of man, is by many being quietly assumed, under the impression that it has been scientifically proven. But the evidence for the antiquity of man has had to be reconsidered, and that reconsideration has greatly shaken the foundations upon which the doctrine has been built; as Principal Dawson says, "The tide is decidedly turning as to the antiquity of man . . . . and the Institute [the Victoria Institute] has certainly done its part in contributing to this result." † And I would just remark in passing, that in the absence of man's antiquity, evolution (so far as man is concerned) is impossible. On the hypothesis of Charles Darwin ten or twenty thousand years would be but a fraction of the time that the *minute* changes of his theory demands.

6. But to come more directly to the subject before us. The probable breaks in the continuity of mammalian life in certain geological periods. Let us first examine the Pleistocene.

7. By some geologists the Pleistocene is considered the equivalent of the Glacial period, whilst others suppose that the Glacial period formed but a part of the Pleistocene, Professor Dawkins placing it at an earlier, and Principal Dawson at a later, part; but for our purpose it will not be necessary to determine which is correct.

8. The last ten years have greatly enlarged our knowledge of the extent of the Earth's glaciation during the Ice age, so

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* Darwin's *Descent of Man*, vol. ii. pp. 389–390.

† Vol. xv. p. 208.

much so, that when the evidence is before you it will be a reasonable question to ask whether or not the Glacial and immediate Post-Glacial conditions did not necessarily produce such a break in the continuity of mammalian life as to be fatal to Darwin's hypothesis?

9. Professor Ramsey, Director-General of the Geological Survey of the United Kingdom, says, of the British Islands in the Glacial epoch, "that they were in great part covered by glacial ice, probably as thick as that of the north of Greenland at the present day";* that when the most extreme cold prevailed the mountains of Scotland were covered with ice; that the glaciers flowing eastward from the Highlands met a vast body of ice coming westerly and southerly from Scandanavia, whilst the ice travelling westward from the Highlands overspread what is now the Island of Lewis and other islands of the outer Hebrides; that a thick ice-sheet from the Grampians overspread the valley of the Tay, and, crossing the Ochil Hills, invaded the valley of the Forth.

10. Professor James Geikie endorses all that Professor Ramsey says upon this subject, for, when writing upon "Changes of Climate during the Glacial Epoch," he says that "every part of Scotland, with the possible exception of a few peaks or tips of the loftiest mountains, has certainly been buried underneath snow and ice";† and, in delivering the presidential address to the "Perthshire Society of Natural Science" in March last, he directed attention to the glacial striations detected on the Sidlaws and Ochils, which, he says, "proves that all this region [that is, Perthshire] was formerly buried underneath ice, which overflowed from the Highlands, sweeping across hills up to the height of 3,000 feet, and pressing out in a general south-east direction."‡

11. Professor Jamieson, F.G.S., of the University of Aberdeen, found evidence of ice having deposited boulders in Scotland on summits 2,000 to 3,000 feet high; but he attributed the action not to that of glaciers, but to floating icebergs. He says that it tells the tale of all Scotland having been at that time under water: Professors Ramsey and Geikie would say under ice; but whether under water or under ice the conclusion drawn by Professor Jamieson would be equally correct. "It involves," he says, "as a consequence, that the present flora and fauna [*i.e.*, of Scotland] date from the Drift period." §

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* *Popular Encyclopædia*, article "Geology."
† *Geological Magazine*, 1872, p. 548.
‡ *Perthshire Advertiser*, March 10, 1881.
§ British Association, 1859.

A break, you will observe, in the continuity of mammalian life in Scotland.

12. England, Ireland, and Wales afford similar evidence. Professor Phillips has traced erratics from Cumberland over a large part of Yorkshire, extending to a height of 1,500 feet above the sea. At Macclesfield I examined a boulder which had travelled from the same district of Cumberland. It had crossed Westmoreland and Lancashire, a distance of nearly 150 miles, and to remove it to the People's Park in Macclesfield, from the field where the ice had left it, eighteen strong horses were required. Professor Ramsey says * that the greater part of the low-lying land of Great Britain and Ireland was, at that time, buried in and moulded by glacial ice, till at length a slow submersion of the land took place. And it will be remembered that the Duke of Argyle, in writing to this Institute upon a paper read by Professor McKenny Hughes, of Cambridge, expressed the wish that the attention of geologists might be drawn more particularly to the admitted fact of sea-gravels at a high elevation on our Welsh and Scottish mountains. And amongst other observations made by his Grace was this, that it was his belief that a submergence under the sea, to the extent of 2,000 feet, had been one of the latest of geological changes, and that during this submergence glacial conditions prevailed over a large part of what is now Europe. The expressed wish of the Duke of Argyle was met by Professor Hughes, who, in the following year, 1880, read before this Institute a valuable paper upon "The Evidences of the later Movements of Elevation and Depression in the British Isles," and adduced evidence from Trimmer, Darbyshire, Lyell, and others, of marine deposits in Wales at heights varying from 1,370 to 1,800 feet, making it clear that the submergence was approximately what his Grace supposed. At 1,250 feet above the sea, Professor Prestwich found similar deposits at Macclesfield; and at 1,200 feet above the sea marine drift of the Glacial period rests upon the hills of Wexford. If, then, the submergence spoken of by Professor Ramsey, was to the extent referred to in the above evidence, must I not say of Wales, England, and Ireland, what Professor Jamieson said of Scotland,—"that the present flora and fauna date from the Drift period"? Are not the conditions such as to make it probable that there would be a break in the continuity of mammalian life in the British Isles?

13. Dr. Page, author of the text books on geology referring

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* *Popular Encyclopædia*, article "Geology."

to Britain and the North of Europe at this period, says, that "the large mammalia of the earlier tertiaries disappeared and the land was submerged to the extent of several thousand feet." *

14. We have evidence, says Mr. Charles Darwin,† of almost every conceivable kind, organic and inorganic, that "within a very recent geological period, central Europe . . . . suffered under an Arctic climate, and that the ruins of a house burnt by fire do not tell their tale more plainly than do the mountains of Scotland and Wales tell their tale of glaciation," and the evidence he traces from the west of Britain to the Ural range. Crossing the English Channel, Sir Henry de la Bèche‡ found good evidence that the north of France had been 1,000 feet at least beneath the icy sea, whilst Mr. Darwin traces the evidence of Arctic conditions to the Pyrenees. On the Jura limestone range I measured an erratic block of granite, 60 feet long, by 40 feet wide and 23 feet high. The granite is peculiar; it contains talc in the place of mica, which rock is not found *in situ* within sixty or seventy miles of this boulder. It must have been transported from the Mont Blanc range of the Alps. Sir Roderick Murchison supposed that this and other erratics on the Jura were floated when the great strath of Switzerland was under water. He thought that the granite blocks were borne on ice floats, but Sir Charles Lyell and geologists generally believe that they were carried on the breast of an enormous glacier, as some of us have seen blocks of granite being carried at the present day. I have tried on the spot to trace the course that the glacier must have taken down the Rhone valley, cross Lake Leman, where now stands the Castle of Chillon, and then over the hills that range at the back of the lovely Vevey and across the country to the present Lake of Neufchâtel, where 800 feet above the lake lies the erratic block in question. I have been on many Alpine glaciers and been overawed with their majesty, but the largest of them is insignificant when compared with the glacier that could have carried this and other blocks of granite from the Alps to the Jura. At that time all Switzerland, except its mountains, must have been under ice, and its fauna must have for the most part perished, as the Alpine ranges would prevent a southern retreat. As we might expect, the Alps not only sent forth their glaciers northward, but also southward, covering the plains of Italy. Mr. Darwin calls attention to the altered

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* Dr. Page, *Text Book of Geology*, p. 161.
† *Origin of Species*, sixth edition, p. 330.
‡ De la Bèche, *Geological Observer*, p. 256.

climate of Northern Italy, and to the fact that gigantic moraines of old glaciers are now clothed by the vine and maize, and Swiss geologists have found Alpine blocks far down into the plains of Lombardy. Still, travelling south and crossing the Mediterranean into Africa, there Dr. Hooker found evidence of ancient glaciers in the Atlas Mountains, and Mr. G. Mawe, who travelled with him, said of the old moraines he there met with, "they tend to confirm the opinion entertained by many geologists that the refrigeration during the Glacial period was almost universal."* A little further south, Sir Charles Lyell is my authority for saying that "in one part of the Glacial period the desert of Sahara was under water between latitude 30° and 20° [a breadth of nearly 700 miles], so that the eastern part of the Mediterranean communicated with that part of the ocean now bounded by the west coast of Africa."† Any farther retreat of the mammalia southward on the African continent would have been effectually cut off.

15. We may have to wait for years for a full geological survey of Asia, but the evidence we have on this subject is in harmony with that of Europe and Africa. Boulder drift was found by Dr. Hooker on Mount Lebanon,‡ and its celebrated cedars growing upon ancient glacial moraines, whilst Mr. Gifford Palgrave met with vestiges of the Glacial period in the neighbourhood of the upper Euphrates. And along the range of the Himalaya, at points 900 miles apart, Mr. Darwin says that glaciers have left their marks of former low descent.

16. We will now leave the Eastern Hemisphere, and see how the evidence stands on the Western. From the report of the geological survey of Illinois, we learn that this State, extending from 42° to 35° N. lat., with an area of 55,000 square miles has its undulating prairies, everywhere covered with ice drift, leaving unmistakable evidence that flotillas of icebergs have made their way across its extended plains. This corresponds with what Professor Hitchcock said many years ago of Massachusetts. His words are: "The conclusion to which I have been irresistibly forced by an examination of this stratum in Massachusetts is, that all the diluvium which had been accumulated by various agencies has been modified by a powerful deluge sweeping from the north and north-west over every part of the State, not excepting its highest mountains." § I need not remind you of the law by which water finds its own

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* Dawkins' *Cave Hunting*, p. 387. Quoted from *A Journey to Morocco.*

† Lyell, *Principles of Geology*, 11th edition, p. 253.

‡ Hooker, *Natural History Review*, p. 12, 1861.

§ *Geology of Massachusetts.*

level. I may not have the same detailed evidence about all the American States; but, if water flowed over the highest mountains in Massachusetts, we know that it filled all the valleys, and covered the uplands, of the other States that were at a lesser altitude than the Massachusetts mountains. Principal Dawson, of Montreal, referring to the great subsidence, says, "Lower levels of the continents were covered with ice-laden water, and the higher regions were occupied with permanent snow and glaciers; 4,000 feet or more in elevation went under water. Then there was a gradual, though intermittent, elevation. The glacial age," he remarks, "proved fatal to a large proportion of the land-life of the previous periods." "On the western side of the Rocky Mountains," Professor Archibald Geikie says, in the July number of *Macmillan's Magazine*, that "over thousands of square miles the strata remain practically unchanged from their original horizontal position; that the country has not been under the sea for a vast succession of geological periods. It has not been buried, like so much of Northern Europe, and North-eastern America, under a thick cover of ice-borne clays and gravels." The land on the west of the Rocky Mountains may not have been submerged to the extent of bringing those parts under water, but Professor A. Geikie, when descending Uintah Mountains, on reaching the valley-bottom, found abundant traces of vanished glaciers in the form of perfect crescent-shaped moraine mounds,* and "on these were strewn huge blocks of red sandstone, borne of old on the surface of the ice from far crags on the sky-line," and this far below the altitude where bushes now bear ripe fruit, which reminded the travellers of the wild gooseberries at home.

17. Darwin says, "Throughout a large part of the United States erratic boulders and scored rocks plainly reveal a former cold period."†

18. Agassiz corroborated the evidence already given of the surface of North America, as well as that of the North of Europe, being covered by the sea, after the ice that carried the erratics had melted away; to which he adds "that it was not until after this period that incontestable traces of the species of animals now living were to be found."‡

19. And, if we travel farther south to Central America, the same kind of evidence there awaits us. The late Mr. Thos. Belt,

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* *Macmillan's Magazine*, "In Wyoming," p. 239.

† *Origin of Species*, sixth edition, p. 330.

‡ *Principles of Zoology*, p. 236.

F.G.S., in the *Quarterly Journal of Science*, October, 1871, says, "The glacial systems had reached, in the tropics, at least as far as Nicaragua, where, within thirteen degrees of the equator, I found undoubted traces of glacial action to 2,000 feet above the sea level where snow now never falls."

20. The same author, in his *Naturalist of Nicaragua*, relates a journey from San Rafael (only about eight degrees from the equator), and says that boulder clay extended the whole distance of the journey, and that ranges of hills appeared to be composed entirely of it. "I was unprepared," he says, "at the time to believe that the Glacial period could have left such memorials of its existence within the tropics, at not greater elevation above the sea than 3,000 feet."* Equally unprepared was Mr. Alfred Russell Wallace to suppose that he had found an erratic more than 20 feet in diameter within less than *half a degree* of the equator. It was on a slight eminence, and so perched, that its being deposited there by a grounded iceberg is the only explanation that he can offer. It was not until further evidence was afforded of glacial action in the valley of the Amazons that he could be satisfied with his own explanation. (Compare "Travels on the Amazon," p. 219, with "Ice Marks in North Wales," *Quarterly Journal of Science*, January, 1867.) Mr. Alfred Wallace and M. Louis Agassiz were at the antipodes on the question of evolution, but were at one on the evidence of ice action at the equator. And Mr. Alfred Tylor, who has written upon the evidence and cause of changes in the sea-level during the Glacial period, has, in this room, expressed his belief in signs of glaciation in equatorial Africa.†

21. Nor is the evidence of the Glacial period confined to the Northern Hemisphere, for at about the same degree south of the equator that the British Isles are north, both Mr. Alfred Wallace and Mr. Charles Darwin found evidence of its former existence. At Tierra del Fuego and at Patagonia glacial drift is found at elevations of 1,400 feet, about the same height as it is found at Wexford. Mr. Charles Darwin quotes the evidence of Dr. J. Haast and Dr. Hector in proof of former glaciers at a low level in New Zealand, whilst, from facts communicated to him by the Rev. W. B. Clarke, he is satisfied that there are traces of the same conditions in the south-east of Australia; whilst Agassiz, in his travels in Brazil, and in the valley of the Amazons, traces the phenomena of glacial

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* *Naturalist in Nicaragua*, pp. 247, 248, 273, 274.

† *Transactions of Victoria Institute*, vol. x. p. 29.

drift almost up to the equator. He says, "Now that I have seen the whole length of the Straits of Magellan, have passed through Smith's Channel, and visited Chiloe, I am prepared to maintain that the whole southern extremity of the American continent has been uniformly moulded by a continuous sheet of ice; everywhere we saw the rounded undulating forms so well known to the student of glacial phenomena as *roches moutonnés.* In Smith's Channel there is no possibility of mistaking the evidence."*

22. Madame Agassiz, who accompanied her husband in his journey in Brazil, says that "at 3° south of the equator he, Professor Agassiz, found undoubted moraines blocking up the valleys; and the evidence of glacial action was, to him, as clear as in the valleys of Switzerland, of Scotland, and of the northern states of America."†

23. And in Central Chili Mr. Darwin found, in one of the valleys of the Andes, a mound of detritus 800 feet in height, which he was afterwards convinced was an ancient glacial moraine; he also spoke of evidence of former glaciers on the sides of the Cordillera at the very equator.‡

24. And Agassiz concluded a lecture at the Cooper's Institute, New York, shortly before his lamented decease, saying, "The ice covered the sea to such an extent that it is a question whether any open water was left at the equator then, as it is a question whether there now is open water at the pole; and, if this be so," he says, "you see at once how this intense cold must have modified the surface of the globe to the extent of excluding all life from the surface."§

25. The evidence before us is that of geologists, and of some of the highest authorities in geological science. There exists, as is seen, a difference of opinion about how much of the devastation was the work of an ice-sheet, of enormous local glaciers, or that of submergence beneath an icy sea. The evidence appears to point to all these causes being in operation in different periods of the Glacial epoch. I may also notice the growing acceptance of the hypothesis of a Pluvial period immediately following the Glacial period, during which time Mr. Alfred Tyler (the propounder of the hypothesis) calculates a rainfall of 125 times that of the present, which filled some of the valleys and rivers with a thousand times their present volume of water, and, as a consequence, deluged the lower lands,

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* Letter to Professor Pierce, copied into *Nature*, July and August, 1872.

† *A Journey in Brazil*, by Madame Agassiz, p. 456.

‡ *Origin of Species*, first edition, p. 373.

§ *New York Tribune* December 30th, 1873.

destroying land life, if, indeed, any escaped the glacial conditions. And I would here remark that it does not require the intense cold of an Arctic climate to destroy a tropical fauna. Darwin sees this in the case of the flora, and says that it is difficult to understand how the tropical productions could have escaped entire annihilation. In the fourth edition of the *Origin of Species* he says, "I had hoped to find evidence that the tropics in some part of the world had escaped the chilling effects of the Glacial period, and had afforded a safe refuge for the suffering tropical productions";* but, up to the time of his writing the fifth edition, he looked in vain for that refuge. If the tropical flora was annihilated, there remained a poor chance of survival for the tropical fauna. Without the care of man a tropical fauna would not, at the present time, live through many winters in the valley of Chamounix, and in that valley the glaciers do not come so near to the sea level as did the glaciers in Nicaragua and at San Rafael in the Glacial period, according to the evidence of the late Thomas Belt, who had made glaciers a part of his study.

26. All the geolgical evidence we possess relating to that period points to conditions that would render almost inevitable a break in the continuity of mammalian life, whilst the hypothesis of Charles Darwin requires that there should be *no* break, but that the present fauna should be the continuation of the older fauna with but slight modifications in the course of descent.

27. Gradual migration of the fauna southward as the increased cold came on has been suggested as a possible escape of the land life; but this would be very partial, for the mountain barriers, owing to the accumulation of ice and snow, would be much more formidable than they are now, and this southern migration would be impossible where submergence had commenced. The low lands would go first under water, and the natural retreat of the fauna would have no reference to points of the compass, but an ascent from time to time as the waters encroached; the subsidence still going on, the hills would eventually become islands. Ultimately, the lower hills would be covered with water, and the higher ranges would bring their glaciers to sea level, when they would be floated off as icebergs. Dr. James Croll remarks that where proper observations have been made we are forced to the conclusion that the connexion between glaciation and submergence is not accidental, but the result of some fixed cause,—that they

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* *Origin of Species*, 4th edition, pp. 448, 450.

invariably accompany each other.* The chances of migration would then be exceedingly small.

28. By the time Mr. Darwin wrote his fifth edition of the *Origin of Species,* Dr. James Croll had made public his hypothesis of the *cause* of the Glacial epoch. Mr. Darwin embraced the hypothesis, which is that either the Northern or the Southern Hemisphere, having its *winter* solstice in aphelion at a period of great eccentricity, the hemisphere in that position, in consequence of the earth's greater distance from the sun, would be in a condition of glaciation. If so, the glaciation of the hemispheres would alternate during successive periods of 10,500 years. In the fourth edition, Mr. Darwin had spoken of the cold of both hemispheres being simultaneous, and then felt the difficulty of understanding how the tropical productions could have escaped annihilation. The difficulty was removed if Dr. Croll's theory were correct; but, unconnected with the present question, I have given my reasons for believing that it is not correct, and Professor Birks † in this room corroborated my views. According to the hypothesis, the Southern Hemisphere ought now to be in a state of glaciation (if the eccentricity were sufficient), for the Southern Hemisphere has at present its winter solstice in aphelion, but the eccentricity is only 3,000,000 of miles. When the Northern Hemisphere was supposed to have had its last glaciation the eccentricity was 10,500,000. The question is often asked if the Southern Hemisphere is not a nearer approach to a glacial condition than is the Northern? The answer is in the affirmative, but not because of the three millions eccentricity, but on account of its larger volume of water. The mean annual temperature of the Southern Hemisphere is lower than that of the Northern, but the mean *winter* temperature is higher by 5°. ‡ It is not winter severity, but summer coolness, that makes the south what it is; the mean summer heat does not reach 60°, whilst that of the north is above 70°; an increased eccentricity would intensify the cold in winter (if it had any effect at all) and increase the temperature in summer, and so produce a climate more like that of the present Northern Hemisphere, which is not now under glacial conditions. Mr. Joseph Murphy well remarks that "an examination of the facts of physical geography shows that the extent of glaciation depends

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* *Climate and Time,* p. 390.

† "Modern Geogonies examined in their bearings on the Antiquity of Man," *Transactions of the Victoria Institute,* vol. xiii. p. 16.

‡ *Distribution of Heat on the Surface of the Globe.*—Professor Dove, July 28th, 1852.

on the extent of perpetual snow, and perpetual snow means *summer* snow."* But increase of eccentricity would *lessen* summer snow in the Southern Hemisphere, and therefore produce an effect the exact contrary of what Croll's hypothesis requires, and in the absence of that hypothesis there is no reason whatever for supposing otherwise than Charles Darwin did when he wrote the fourth edition of his book. The evidence being satisfactory of the glaciation in both hemispheres, the simultaneousness of that glaciation would occur in nature's course.

29. When the Glacial period had passed away and the land was re-elevated, Page says, "A new fauna and flora suitable to the new conditions were then established in Europe,"† which harmonises with what Professor Dawkins says about the mid-Pleistocene mammalia differing from the early Pleistocene group by the incoming of species hitherto unknown, and amongst these man is to be reckoned.‡

30. Man had no existence in pre-glacial times. Every attempt to prove otherwise has signally failed. Professor McKenny Hughes, although an advocate for the doctrine of man's antiquity, in reviewing the present state of the evidence bearing upon the question, emphatically says that "the evidence for the antiquity of man has completely broken down in all cases where it has been attempted to assign him to a period more remote than the post-glacial river gravels."§

31. Was man, then, a new creation or an evolution from an old fauna? Sir John Lubbock has reminded us in his late address that evolution does not mean that a sheep might turn to a cow, or a zebra to a horse. That no one would more confidently withstand any such hypothesis than would Charles Darwin, his view being not that the one could be changed into the other, but that "both are descended from a common ancestor." In the words of Darwin, "species have descended from other species by insensibly fine gradations."‖

32. Before the Glacial epoch man was not, but when it passed away, and a new fauna appeared, man was there. If this is to be explained by evolution, when did the evolution take place? Professor Dawkins founds his argument for the non-existence of man in Europe in the Pliocene period on the fact that in all Europe he can only find one solitary species of

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* *Spectator*, May 2, 1874.

† *Elementary Handbook of Geology*, p. 133.

‡ *Early Man in Britain*, p. 134. Ibid. 91, 93.

§ "The Present State of the Evidence bearing upon the Question of the Antiquity of Man," *Transactions of the Victoria Institute*, vol. xiii. p. 327.

‖ *Origin of Species*, p. 171.

Pliocene mammal that is now the associate of man, and he does not find a single specimen from the Miocene.

33. Man, says the evolutionist, was derived from some anthropoid ape. Did that ape struggle through the Ice period? If man was derived from the ape, the theory requires that at a certain point of time the ape should be so near to man, or the man to the ape, that it would have been impossible to say whether the mammal under consideration was man or ape. Darwin stakes his theory upon this. He says,—"If it could be demonstrated that any complete organ existed, which could not possibly have been formed by *minute successive slight modifications,* my theory would absolutely break down"; * and Professor Dawkins endorsed what Charles Darwin says, in these words, that "between his [man's] appearance in the Pleistocene age and the present day the time is too small to have produced appreciable *physical* or intellectual change."† Immense time is asked for because of the *minuteness* of each successive change. Dryopithicus is claimed to be the most advanced of the ape kind (some of his bones may be seen in the new Natural History Museum); but Dryopithicus became extinct in the Miocene age, leaving the whole of the Pliocene to separate him from man; besides which, Professor Dawkins disclaims for the higher apes of the European Miocene and Pliocene period "any tendency to assume human characters"; he also admits "the first appearance of man as a man and not as a man-like brute."‡ Dr. Virchow goes so far as to say,§ "We must really acknowledge that there is a complete absence of any fossil type of a lower stage in the development of man."

34. One of the two oldest skulls known to us, the Engis skull, shows no inferiority to an average modern skull.

35. When, then, did the ape become a man by *minute successive slight modifications,* upon the correctness of which Charles Darwin stakes his theory of evolution. Was it in the Glacial period? I see no other time left for the change. How long, then, did the Glacial period last? Professor Boyd Dawkins, believing in the geological antiquity of man, would not place his first appearance on the earth as man at less than 200,000 years; and, if that is not long enough to produce any appreciable physical change, how long would it take to evolve man from an ape? Why, vastly longer than the Glacial epoch lasted, even upon Dr. Croll's hypothesis, for the eccentricity which was supposed necessary to produce a Glacial epoch had come

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* *Origin of Species*, p. 239.

† *Cave Hunting*, p. 425.

‡ *Cave Hunting*, p. 425.

§ *Leisure Hour*, 1878, p. 334.

and gone in less than 200,000 years. If that period is not long enough to produce an appreciable change, 160,000 years added to it (which is Croll's estimate for the Glacial epoch) certainly would not convert an ape into a man. I am inclined, then, to say that Charles Darwin's theory has absolutely broken down. Broken down from want of time.

36. To the question, by what successive steps did man rise to the culture of a flint-chipping savage? The candid admission of Professor Boyd Dawkins is, that on this point there is no *evidence*. We can merely guess.*

37. I have adduced much evidence respecting the Glacial period, and that evidence points to a necessary break in the continuity of life, and it will require more than a guess to take the place of that evidence. I do not profess to have proved the break to demonstration, but I think I have succeeded in showing it to a very high amount of probability, and, if a break, then man was created, not evolved.

38. Those who hold to the hypothesis of evolution would require to bring evidence of more than a few survivals from a pre-glacial period to account for a new fauna of *many* species in post-glacial times. Every species now living should have had its representative in pre-glacial times, seeing that there was not time during the Glacial period, nor since, to produce the change required by the hypothesis. Every form now living not so represented must have been a creation of post-glacial times.

39. I am now anxious to see what is the evidence on the other side, as it is vital to the hypothesis of evolution that there should be no *break*, and no post-glacial creation. Professor Huxley's pedigree of the horse is generally referred to as the most conclusive (it was mentioned in the President's address). The idea afloat is that Professor Huxley has proved the doctrine of evolution, so far as the horse is concerned, and the inference is drawn that what is true of the horse is, in all probability, true of all other animal forms.

40. Professor Huxley claims to have traced the horse back to the hipparion, hipparion to anchitherium, and anchitherium to orohippus. The pedigree is traced principally by the feet, the assumption being that all the various forms of the mammalian foot have been derived from animals with five-toed feet.

41. The bear and the horse (Professor Huxley's own illustrations)† are both mammals, and both constructed on the same

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* *Cave Hunting*, p. 426.

† Lecture by Professor Huxley, London Institute, 1876, reported in the *English Mechanic*.

general plan, but with significant differences. The bear has two bones in the arm of each front leg, the radius and the ulna, and in each hind leg two distinct bones, the tibia and fibula; whilst the horse has these two bones coalesced in both front and hind legs. But the principal difference lies in the number of their toes. The bear has five toes on each foot; the horse has but one, with two small splint bones, which are named rudimental toes. The bear's middle toe answers to the horse's one toe or hoof. On the theory of development by natural selection and survival of the fittest, the two mammals in question are held to have descended from a common ancestry. The horse, being the differentiated animal, has to be traced back to an ancestor with the two bones in each leg and the possessor of five toes.

42. Professor Huxley has found, in an older stratum than the present, the hipparion with the two bones in each front leg, and with three toes (although only one reaches the ground); and in a still older stratum the anchitherium, with three toes, all of which reach the ground, all serviceable toes; and, still lower down, orohippus, with four toes on the front feet, and three on the hind feet. Upon this evidence Professor Huxley said "that he thought the chain of ascertained facts verified so far the doctrine of evolution, and justified him in saying 'he would not in future take the trouble to discuss that doctrine on *à priori* grounds.'"

43. In the judgment of Professor Huxley the evidence is demonstrative. He has said so, and entitles the third lecture of the "American Addresses" "The Demonstrative Evidence of Evolution"; and to the audience in Chickering Hall, New York, he said that evolution was as thoroughly proved as the Copernican theory.

44. If the doctrine of evolution is true, then the interesting facts brought under our notice by Professor Huxley are certainly in harmony with that doctrine; but it does not, therefore, follow that these facts in themselves prove the truth of the doctrine.

45. We are necessarily without a particle of collateral evidence that these divers-toed mammals descended from each other in the line indicated. This has to be assumed on the ground of their resembling construction and their following each other in order of strata,—Eocene, Miocene, Pliocene, Pleistocene.

46. But with a certain resemblance in construction there were also very marked differences. They differed from each other, not in the number of their toes only; hipparion differed from the present horse both in limbs and teeth; and anchitherium differed from hipparion as much as hipparion differed from the

present horse. It sounds almost like a slip; but Professor Huxley is reported to have said of the equines of the genus anchitherium found in the Miocene beds in Germany, France, and Greece, that they "differ *essentially* from the modern horse;" whilst orohippus was an animal about the size of a fox.

47. The probability of the correctness of Professor Huxley's pedigree of the horse would have been the greater if all the different types from orohippus to the living horse had been found on the same continent; but it was not so. Anchitherium is as far back as European deposits would carry Professor Huxley. For orohippus we have to go to the Rocky Mountains of America. It was there in the Eocene beds that Professor Marsh found orohippus, the assumed ancestor of the living horse. The old world, which had hitherto been considered the early home of the horse, knows nothing about the four-toed orohippus. This has led Professor Marsh to claim America as the original home of the horse, and Professor Huxley yields the claim.

48. But neither in America is the pedigree complete; for, whatever were the fossil forms, no living horse of any kind was there found. The existing horse of America was introduced from Europe.

49. Without wishing to depreciate the value of Professor Huxley's horse, I cannot help thinking that its pedigree would not be accepted at Tattersall's.

50. Again, the pedigree is incomplete on Dr. Huxley's own showing; for the bear has five toes on each foot, but we have not yet found the five-toed horse. Orohippus could only boast of fourteen toes altogether; but twenty toes are wanted to make the case complete.

51. Eohippus has since been discovered by Professor Marsh in a still lower horizon than orohippus; and, whatever may be the indications, it certainly has but the same number of perfect toes as orohippus, and Charles Darwin would not consider six toes short as a slight modification in the course of descent. His theory would require a vast number more gradual modifications before the common ancestor of the bear and the horse is reached. I submit that the pedigree is not complete; and, if it were, is it the evolution of the horse? The pedigree begins with what is assumed to be a horse, and ends with a horse. We must trace the horse back to an ancestor that is not a horse, before we are on the threshold of evolution. The pedigree of Professor Huxley's horse, if correct, is only tracing the varieties of the horse kind.

52. And this brings me to the Second break in the continuity of mammalian life.

53. Professor Marsh says that the native horses of America were all extinct, and that at a very early period. The presumed palæolithic man in America had no horses.

TERTIARY.	PLEISTOCENE.	POST GLACIAL GRAVELS.
		GLACIAL BEDS.
	PLIOCENE.	
	MIOCENE.	
	EOCENE.	
	CRETACEOUS.	CHALK.
		UPPER GREENSAND.
		GAULT.
		LOWER GREENSAND.
	OOLITE.	PURBECK BEDS.
		STONESFIELD SLATE.
		RHAETIC BEDS.
	LIAS.	
	TRIAS.	

54. Professor Marsh does not mention the glacial conditions as the cause of that extinction. He calls the extinction a mystery. To Principal Dawson it was no mystery; for you will remember that he said the land went under water 4,000 feet in depth, and that the glacial age proved fatal to a large proportion of the land-life. If so, does not that solve the mystery?

55. But, if the horse did survive that period, we come now to a still greater difficulty, a difficulty which is shared by all the great mammalian pachyderms of the Eocene period.

56. Professor Marsh, in his "Introduction and Succession of Vertebrate Life in America" (an address delivered before the American Association for the Advancement of Science, August,

1877) says that, "In the lowest tertiary beds in the country a rich mammalian fauna suddenly makes its appearance." The lowest tertiary beds are the Eocene. It was the Eocene and the lowest of the Eocene beds that yielded the remains of the fourteen-toed orohippus and eohippus. If, then, this rich mammalian fauna, which suddenly appeared, and orohippus and eohippus were not fresh creations, but evolutions, where do we look for their line of ancestors? (See Chart on previous page.)

57. The next stratum that we come to is the enormously thick cretaceous, consisting of the chalk, the upper green sand, the gault, and the lower green sand. I think I may say without the fear of contradiction that throughout the length, and breadth, and depth of the rocks of the Cretaceous age, no land mammals of any kind have ever been found in any part of the world.

58. Professor Marsh makes a similar statement, and says, "that this is especially to be regretted, as it is evidently to the Cretaceous that we must look for the fossil representations of any of our present groups of mammals as well as for indications of their more ancient lineage." But, however it may be regretted, there is the fact before us. Deposits of enormous thickness which had taken thousands upon thousands of years to form, have never yielded to the geologist a single tooth or bone of any kind of mammal; where, then, are we to look for the common ancestor of the bear and the horse, and for the ancestors of the rich fauna of the Eocene? Through the whole series of descending rocks (after passing the Cretaceous) down to the Laurentian, the only mammalian forms known to the palæontologist are those in the Rhætic beds of Somerset (represented by a single tooth), in the Stonesfield slates of Oxfordshire, and the Purbeck beds of Swanage. These are the only forms known in the Old World, the largest is about the size of a full-grown rat.

59. But it is to the New World that we are directed for the earliest ancestor of the horse. And it was of the New World that Professor Marsh was speaking when he said, "that a rich mammalian fauna suddenly made its appearance." What about the pre-Eocene Mammalia of America? I will again quote Professor Marsh, who says that "a single small marsupial from the Trias is the only mammal found in all the American rocks below the Eocene."

60. Dr. Darwin's hypothesis demands a long line of diversified forms, evolved by minute successive slight modifications. From the Trias to the Eocene no mammal of any kind is found in the New World nor in the Old World from the Eocene to

the Purbeck beds. To say that these multitudinous diversified successive forms may have existed, although not one of them has yet been found, is simply conjecture, and must not rank as science. Evolution is an hypothesis founded too much upon conjecture. Professor Huxley speaks about the demonstrative evidence of evolution. There is no demonstrative evidence of evolution. It is a necessary postulate of the doctrine of evolution, that from the highest animal down to the lowest speck of protoplasmic matter in which life can be manifested there must be a series of gradations leading from one end to the other.* We come to the Cretaceous, and no part of such series can be shown. So far as the present evidence goes, there is a break in the continuity of mammalian life in the Cretaceous period.

61. I have also attempted to show that there was a break in the continuity of mammalian life in the Glacial epoch, which occurred in the Pleistocene period. Now either of these breaks proves fatal to Dr. Darwin's hypothesis of evolution.

The Chairman (J. E. Howard, Esq., F.R.S.).—I am sure I may offer Mr. Callard the best thanks of this meeting. I regard his paper as a most valuable contribution to our knowledge. My own acquaintance with geology, however, is too limited to discuss the whole question of breaks in the continuity of mammalian life, though I believe Mr. Callard to be correct in his statements.

In a portion of the Festiniog district, specially known to me, the rocks above Cwmorthin present very markedly the features described by Mr. Callard. Above 1,300 feet from the sea-level the crags of Moel Wynn rise sharp and distinct with slaty cleavage—below that level commence almost suddenly the *roches moutonnés*, indicating submergence under an icy sea, rather than a glacier, if I read them aright. A little lower is a fine specimen of an ice-carried boulder, perched fantastically and as if artificially placed upon a rock. Mr. Callard might have considerably strengthened his argument as to South America, by referring to D'Orbigny's *Voyage dans l'Amérique Méridionale*, which happens to be in my possession, and from which extracts will be found in my appendix to *The Caves of South Devon.* This geologist, whose work on South America is second only to Humboldt's, shows that the immense deposit of the Pampas, occupying nearly 24,000 square leagues of surface, was "in some sort *deposited in a very short time, as the result of a great terrestrial commotion.*" This immense deposit presents for seven degrees and a half in breadth the same features, the same peculiar red clay, and the remains of the same creatures, all swept to destruction. This flood reached to a height of 4,000 mètres (13,000 feet and more) above the level of the sea. D'Orbigny ridicules Darwin, who attributes these effects (or perhaps I should say *that portion* of them which fell under his observation) to *a River.* The deposits of bones, I am informed, are most curious—especially in Columbia, where one place is called *Los Gigantes*, from their abundance. This was out of Humboldt's course, and has not since been explored by any scientific traveller that I am aware of. I do not think that any remains have been found showing that man was a denizen of the earth at the time when this occurred; but it is otherwise in Guyana, where Dr. Maurel, a member of the Anthropological Society of Paris, has found well-formed stone implements beneath a layer of auriferous clay, showing, as he considers, "que l'homme existait à la Guyane française au moment où un mouvement des eaux a couvert sa surface."

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* Dr. Huxley's *American Addresses*, Lecture 2, p. 46.

How do the evolutionists meet all these facts opposed to their theory? Simply by silence. The tactics of the evolutionist sect are remarkable. Whatever they cannot answer they studiously ignore; and, whatever assertions they may choose to make, they expect their credulous readers to accept as true. The Editor of the *Journal of Science* has found himself at last compelled to notice a translation of M. A. de Quatrefages on the "Human Species," which has reached a second edition. I hope that neither M. Quatrefages nor any of the foreign members of the Victoria Institute will take this so-called "Analysis" as a specimen either of the candour or good feeling of our insular "scientists." I forbear to stigmatise the whole as it deserves, but notice one expression. This reviewer asks (p. 748), "Does not the balance of facts observed point so uniformly *against* the fixity and reality of species that *the day for useful discussion is well-nigh over?*" This very *characteristic* suggestion merits attention. *Discussion* is indeed *useless* with men of a certain class! He depreciates M. Quatrefages, whose eminence as a naturalist has been, I think, universally admitted in France, and asks: "Is he not aware that Darwin has been, and still is, one of the most patient and persevering observers and experimentators (*sic*) the world has ever witnessed?" Probably he is, and *also* cognisant, as are French naturalists generally, that the patience of his observation does not prove that his judgment is accurate. They think that in Darwin we have an acute observer, but an illogical thinker.

The Honorary Secretary (Captain F. Petrie) then read the following communication from S. R. Pattison, Esq., Member of Council of the Geological Society:—

6th February, 1882.

I quite agree with Mr. Callard's condemnation of Mr. Darwin's hypothesis of evolution, but not on the grounds indicated in the paper. There was no break in mammalian life at the Glacial epoch. The Horse, Hippopotamus, Boar, Red deer, Rein-deer, Elk, Roebuck, Ox, Bison, Musk Ox, Bear, Lion, Mammoth, Hyena, and a host of small animals existing before it, survived until after, and most of them until the present day, in identical species. Nor can it be shown that the glacial work was strictly contemporaneous over the whole earth, so that there may not have been a total extinction of species by cold, and the above biological facts show that there was not.

With par. 58 I entirely agree, and submit that it is quite sufficient to sustain the conclusion, viz., that it is fatal to evolution as interpreted by Mr. Darwin. The supposed progenitors of the horse were clearly separate and distinct beings, not lineally connected with predecessors or successors of any other form. We have no instance whatever of descent from species to species by "insensibly fine gradations"; but we have everywhere proof of creation by plan and method, dimly shadowed forth in nature's mirror—a divine evolution, hitherto, as to its *modus operandi*, entirely beyond our present ken.

Also the following communication from the Rev. J. Magnus Mello, M.A., F.G.S.:—

The Rectory, Brampton St. Thomas, Chesterfield, Feb. 4th.

I have read Mr. Callard's paper, which you were good enough to send me, with considerable interest, and I venture to make a few remarks upon it.

Everything turns upon one point, that is, the simultaneous and universal prevalence of the Glacial period over the entire globe. Could that be once firmly established, then it would indeed be fatal to the doctrine of evolution, at any rate, as regards the higher forms of animal and vegetable life. This is the great question which we are all anxious to have answered, not that I dread the consequences which some suppose are involved in accepting evolution, if the doctrine is true. I have faith to believe that natural and revealed truth will ever prove to be one; but before accepting evolution as absolutely proven, however fascinating the theory may be, and however good a working hypothesis it is, we are right in requiring, not guesses nor plausibilities, but absolute demonstration, as far as it is possible to have it. That there are almost innumerable facts in the natural world, which, if they do not actually prove, yet very strongly support many of the statements of the evolutionists, is undoubtedly the opinion of a very large number of the ablest naturalists, and such evidence as that brought forward in Gaudry's *Enchainements du Monde Animal* and the strange "convergence of all sciences, from physics to chemistry and physiology, towards *some* doctrine of evolution and development," are facts too striking to be passed over without the most serious consideration. But the theory is as yet far from being so proven as some would make out. Before it can be pronounced true there are many difficulties to be got rid of, apart from such supposed ones now discussed, which as yet seem almost insuperable. The true attitude of science is to accumulate her facts and wait patiently for the clue which will unravel the web of mystery by which we are surrounded.

Was the Glacial period simultaneous and universal? The answer to this question will not be found, as far as I can see, in the facts to which Mr. Callard calls attention, viz., that traces of former glaciation may now be discovered over enormous tracts in both hemispheres, and in both the old and new worlds. That such traces exist no geologist will deny; but were all these areas under ice or sea *at the same time*, and did the intense cold *universally* prevail over *every* continent at *one period?* The question must be answered rather by the astronomer or the physicist, I think, than the geologist; the mere fact that once the greater part, or even the whole of Northern Europe, was clothed in an icy mantle, which would utterly destroy all terrestrial life, will not serve to discredit the evolutionist, unless it can be absolutely proved that the other parts of the continent were either themselves equally glaciated at the same time, or else so cut off from the ice-covered regions that migration would be an impossibility. If the physicist can tell us that we must certainly believe that the entire globe was involved at one and the same time in glacial conditions, then nothing more need be said. There *must* have been new creations, and evolution, so far as its continuity through all time is concerned, is non-existent; but till we are thus met we must hold our judgment in suspense. Mr. Callard apparently tells us that the question *is* settled—that Professor Birks has corroborated the view that the cold of both hemispheres was simultaneous. What say the leading physicists to this? If it is still open to question, then there are other facts we have to take into consideration, which *seem*, at any rate, to show that all terrestrial existence may not have been so absolutely broken off by the Glacial period. There were some species of animals living before the great cold set in which were still found living when it had passed away; or may we not say even during its continuance, for it has been shown that the Glacial period itself had its breaks, and in the inter-glacial deposits the remains of a fauna and flora are found. Amongst the animals which lived both before and after were the Hippopotamus, an animal as old as the Pleiocene age, and another—the formidable Carnivore (*Machairodus latidens*), also of the Pleiocene species, was apparently living after the culmination of the Glacial period. Elephas antiquus (the Mammoth), and Rhinoceros (*Megarhinus*) lived both before and after the refrigeration, and what is thus true of these animals is true also of many others. *A priori*, it seems hardly likely that there should have been a new creation of identical species; the theory of migration seems more probable. The most remarkable break in continuity would appear to be rather between the epoch of palæolithic and that of neolithic man, when the existing fauna made their first appearance in Europe; but even then there were survivals from that of the pleistocene, or, if not survivals, then new creations of identical species. Thus an allowed break in the continuity of life may have occurred in any given area, but yet that area may have been repopulated, not by new creations, but by the gradual immigration of species, some of which previously occupied it, whilst others which had not as yet appeared there, but may have been their contemporaries in more distant countries—probably to the south and east—pushed their way forward to the north as the climate permitted. This appears to me to be more probable than to suppose a new creation of species for each district after the passing away of the great cold of the Glacial times; and I think, too, that the present distribution of both the testacea and the flora of North-western Europe points in the same direction. Therefore, for the establishment of Mr. Callard's views, we must ask for a general admission on the part of those scientific authorities who have the means of verifying the facts, that the glaciation must have been both simultaneous and universal. This admission I do not think we have at present.

The following communication from the Rev. E. Duke, M.A., F.G.S., was also received:—

Lake House, Salisbury, Feb. 3, 1882.

Mr. Callard has treated his subject clearly and satisfactorily. His line of argument is one good proof, among many others, of the unsoundness of the evolution theory. The truth, I am convinced, is that, though the Creator has worked in all ages *after the manner of evolution*, the successive species of animal and vegetable life have been created, and not evolved or transmuted.

The *resemblance* to evolution is close enough to afford scientific men who hold these views an apparent ground for their ingenious theory, and too close to enable ordinary readers to see readily how to refute them. Hence a paper like Mr. Callard's is very valuable.

The Chairman.—I wish the writer of the second communication had given proofs of some of his statements.

Mr. W. Griffith.—Mr. Callard, in his most interesting paper, has led us a journey from Switzerland to Italy,—from the Alps to the Jura; thence into Africa and across the Great Desert; from thence to the plains of America and the Rocky Mountains; and, further on again, to the mountain ranges of the great Asiatic continent. He has certainly established one great fact most completely, namely, that in all these regions there has been a Glacial epoch, during which glaciers of vast size existed and undoubtedly exercised a corresponding influence on vegetable and animal life. He has also brought forward another question, as to which the evidence is of a different description. I certainly agree to some extent with the conclusion arrived at by Mr. Callard and Mr. Pattison, the writer of the first letter read. But, at the same time, I also agree with Mr. Mello, that the evidence of the effects of the Glacial period is not altogether so satisfactory as we could wish. It is necessary for the theory founded on the Glacial epoch that that period should have been both universal and simultaneous, in order to produce a break in the continuity of life; for if one portion of the earth was still warmed by the heat of the sun, while the other portion was under the action of the terrible glacial sea which Mr. Callard has described, it would follow that, in that portion which received the sun's warmth, both the flora and fauna, the vegetable and animal life, might continue to exist. I could not help thinking, as Mr. Callard led us on the voyage he was taking round the globe, of a journey I once made myself, from the plains of Northern Italy to the Alps he has so eloquently described. While on the plains of Northern Italy, I was among an almost tropical vegetation, the Indian corn was growing to a height of several feet; in fact, it completely overtopped the tallest man, while the luxuriance of all the other vegetation was remarkable. Only a few miles further north, in the valley of Aosta, this vegetation had all disappeared, and a few miles beyond that, when we reached the pass surmounted by the great St. Bernard Hospice, summer and spring had gone, and we were nearing the confines of winter, and approaching the everlasting glaciers of Mont Blanc; but even at that great height the Alpine flora still existed, though, of course, as we mounted higher among the perpetual snow towards the very summit, the flora disappeared, in a manner corresponding with that of the glacial flora already described. Thus, then, we have at the present period in Europe huge glaciers among the higher mountain ranges, and within less than a hundred miles we get into a sub-tropical region where the Indian corn waves in the richest luxuriance on the plains. I have, therefore, come to the conclusion that it is not established that the glacial periods were simultaneous and universal and, if either of these two conditions be wanting, the break of continuity contended for by the author of this paper is not established, because there may have been, as in the case I have referred to, spots where the deleterious influence produced by glacial action did not exist. At the same time I think that the great eloquence employed, and the strong arguments and large number of facts adduced by Mr. Callard are hardly required for the purpose of upsetting the Darwinian theory, which, after all, is little more than an hypothesis. Professor Huxley has said, as stated in the paper, "that the palæontological discoveries of the last decade are so completely in accordance with the requirements of this hypothesis, that if it had not existed the palæontologists would have had to invent it." I cannot compliment Mr. Huxley on the clearness of his language. When I read the passage I hardly knew what he meant by saying "that if it had not existed the palæontologists would have had to invent it." If what had not existed? Evolution or the hypothesis? Which of the two would the palæontologist have had to invent? Looking at it grammatically, it is loosely expressed; looking at it logically, the consequences do not follow. Putting the most favourable construction upon it, and supposing the Professor to mean that if evolution had not existed, as a matter of fact, the palæontologist would have had to invent it,—and I think you will agree with me that that is the best construction we can place upon it,—what does it come to? If it did not exist, it must have been invented. What is invention? We discover a fact or truth; we invent a theory. Truth exists independently of man; an invention is the act of man. To conclude, I would say that the burden of proof rests on those who advance this new theory. They certainly have not established it by evidence. It is imaginative, fanciful, and speculative, the result of defective induction, illogical ratiocination. It is unsupported by, or rather it is contradicted by, the evidence; and it rests for its success on bold and unwarranted assertion. Such an assertion was that made in a lecture delivered in America,—that it is demonstratively proved "as strongly as the Copernican theory." I only hope the orator had a very "soft" audience to whom he could address such arguments, and I can only suppose that he knew very little about the Copernican theory. If he had known that the astronomer-general observes the stars and calculates their positions, and two years in advance publishes the results of these calculations in the *Nautical Almanack* which is used by navigators in their voyages round the globe, and that all the vessels engaged in these long voyages are dependent on the Copernican theory, I think he might have shown a little more modesty in the assertion he made that the theory he has propounded is as strong as that of Copernicus.

Mr. E. CHARLESWORTH, F.G.S. (a visitor).—I was extremely gratified at receiving, two or three days ago, from Captain Petrie, a copy of the paper that has been read this evening. I read it with the greatest pleasure and interest, and to-night have the still further advantage of listening to its rehearsal by the author himself. But the conclusion at which I arrived on reading the paper was this,—that while it conveys, in a most instructive manner and with a high order of ability, a great deal of what can be advanced in opposition to the theory of evolution, yet, taking the paper as a whole, it fails to carry conviction to my mind. I will now proceed to tell you in what I think the weak feature of the paper consists, and it is this:

that the author has rested too much on mere negative evidence in the conclusions he has drawn with regard to one of the most remarkable problems of natural science which has ever been brought before the intellectual world. Negative evidence, I admit, may be carried to a point in which it may be said to have almost the same weight as positive evidence; but, I would ask, is this the case with the negative evidence upon which the opponents of the doctrine of evolution rest? I answer, most assuredly not. It is impracticable at this late hour of the evening to attempt to go through all the various points and interesting string of facts and reasoning we find in Mr. Callard's paper. I will, therefore, simply call attention to one matter, which I think he relies upon as his sheet anchor in his opposition to the doctrine of evolution. It is this: that, in order to establish that doctrine, it must be proved that there has been a continuous series of life forms, carried onwards by numberless insensible gradations, from a low to a high type, through all the various phases of animal life which we find represented on or in the crust of the earth; and that this series of multitudinous forms shall have had no break. Now coming to what the author has said, with regard to the alleged break in the Cretaceous period, I would ask your attention to this passage:—"I come to the Cretaceous, and no part of such series can be shown. So far as the present evidence goes, there is a break in the continuity of mammalian life in the Cretaceous period." Here, in referring to mammalian life, I must ask you to bear in mind that the doctrine of evolution does not restrict itself to mammalian life. It includes the whole range of animal life; but to-night we are dealing with mammalian life. Now the Cretaceous system of rocks forms a very large portion of the whole series of fossil-bearing strata. It extends from England over thousands of square miles in Europe, and again we have it in North America; and it is true that in all parts of the world, wherever this system of rocks has been explored, we have found no trace of land mammalian life. Consequently Mr. Callard has come to the conclusion, and I am not surprised at it, that there was no mammalian life in that period. But this conclusion, I say, is wholly and entirely illogical, and can be at once refuted and extinguished by any one who has had anything like a large practical experience in the exploration of fossiliferous strata. I will give you chapter and verse, by citing a perfectly parallel case, to prove how utterly worthless—I am sure Mr. Callard will forgive me for using so strong a term—is the conclusion he bases on this apparent break in the continuity of past mammalian life. There is, in East Anglia, a geological formation which is locally known under the name "crag"; with regard to which I may say, that when William Smith founded the science of Geology, some fifty or sixty or years ago, he, and other geologists, adopted the local name "crag" as a geological term. Of course, when Geology began to rank as a science, geologists had to construct a terminology denoting the different strata. When they could find a name that was in common use, they took it. "Chalk" is a case in point, for that name has become incorporated in all systems of stratigraphica

Geology. Nobody could tell what the origin of the name "crag" was, but that local name had long been applied in Norfolk and Suffolk to beds of sand filled more or less with beautiful fossil shells. One hundred years ago collections from these fossils-beds were commenced. Dale, in his work on the Antiquities of Harwich, was the first to give us particulars of the fossils found in the crag; and this formation has ever since been a favourite field for all who interest themselves in fossil remains. It may safely be said that there has been, and is still, an enormous amount of research carried on in the East Anglian crag. Well, forty years ago, the conclusion geologists had arrived at was that this Suffolk crag was rich beyond all description in the remains of shell and fish life generally, but that there was no trace in it of mammalian life. By mammalian life, I would explain that I refer to the class of animals commonly coming under the designation of animals which suckle their young, whether quadrupeds, bats, or whales—all such animals are mammalian. Here let me call attention to the fact that this was negative evidence. I will now proceed to show how a mere accident utterly revolutionised and upset this negative evidence, and gave us a complete picture of a vast amount of mammalian life previously unsuspected. A clergyman, the Rev. J. S. Henslow, went one day to Felixstowe, and, while geologising among the crag and cliffs, came on certain dark-coloured stones, which he sent to London in order to have them analysed. It turned out that these stones, previously looked upon as worthless, contained a most valuable material —phosphate of lime. This led to these stones being collected in enormous numbers, by turning over and sifting the crag to get at them. Now, although during half a century scores of indefatigable geologists had been searching among the crag, and finding shells, corals, and fish teeth, but no trace of mammalian existence, no sooner did the navvies commence sifting, than out came abundant evidence of crag mammalian life, including mastodons, rhinoceroses, beavers, tapirs, deer, and various other animals belonging to the mammalian class. All this was owing to the mere accident of Mr. Henslow finding the stones I have mentioned. Now, supposing we were to discover in the interior of an unexplored part of some vast continent a lake previously unknown, and that some one going across in a canoe were to cast a net and draw it up, and, obtaining nothing, were to say, "I have caught nc fish;" what would you think of his logic if he were thereupon to add, "There are no fish in this lake, for I have thrown my net, and drawn it up, and find it empty." But that would be just as reliable evidence as you have got from the cretaceous rocks—in fact, it would be a parallel case to your saying, "There are no remains of mammalian life in the cretaceous rocks, because the chalk quarries we dig and the wells we sink give us none." This is a point which I would ask Mr. Callard to think well over. But, in saying this, I would add that, supposing there should be some day evidence forthcoming of land mammalian life in the cretaceous rocks, such evidence might not in any way support the theory of evolution. I should like to go on, but I fear I have detained you too long already. I may, however, say that I look on the evolution theory as one of those grand problems which are of the very greatest use in leading to further acquisitions of human knowledge. Every now and then some great question is brought forward, respecting which the highest authorities—men whom we regard as our teachers—are equally divided in opinion. It is so with the alleged evidence of life in the vast series of Canadian rocks called Laurentian—forming strata older than anything in this country. Those Laurentian rocks spread over a vast extent and through an immense depth—rocks enclosing a peculiar structure, which Dr. Carpenter and many others of the highest practical knowledge say most positively is a life structure, a structure to which has been given the name Eozoon; but there are other high authorities who say that Eozoon is a mineral structure, and not of organic formation. Here, then, on both sides we have men of eminence working, on the one hand to show that the Laurentian rocks give us life structure, and on the other to show that they do not; each engaged in a kind of rivalry which, even if it does not succeed in deciding the problem, is sure to bring forth facts of the highest interest in other directions. Therefore, I hope it will not for a moment be thought that these discussions are at all useless because the men to whom we should look to guide us are divided in opinion. On the contrary, there is every reason why we should discuss these questions, and my own feeling on the matter now before us is, that while the theory of evolution gets us out of one series of difficulties, it lands us, on the other hand, in a fresh series. I am patiently waiting, and hoping for the time to arrive when that doctrine will either be entirely repudiated or completely accepted. I wish now to call Mr. Callard's attention to one or two slips in his paper. The first on which a correction is needed is one of special interest to myself. Mr. Callard tells us that the mammals found in the Stonesfield oolitic slates are no bigger than rats. It so happens that I was the discoverer of the most important of all the known mammals in the strata, and I gave it the name "*stereognathus*," or "solid-jaw." Now this animal was a great deal larger than a rat; I think it must have been as big as a cat, but at any rate it was as large as a hedgehog. It will not do in matters of such importance as these Stonesfield mammals, which geologists all the world over read of with great interest, to make even a small slip. Then, again, with regard to what the author says about the cretaceous rocks; I think Mr. Callard must make a correction, because, although no remains of land mammalian life have been discovered in the cretaceous series, there is strong evidence in the publications of the Geological Society, of which Mr. Callard is a Fellow, of a marine mammalian animal having been found in the cretaceous rocks. I forget the name given to it, but three or four of the neck vertebræ are figured in the Journal of the Society. I can only now conclude by saying that the author has handled the subject in a most pleasant and able manner, though I cannot say that he has made me an anti-evolutionist.

Mr. D. Howard, V.P.I$^{\text{nst.}}$C$^{\text{hem.}}$ (who had taken the Chair in the place of Mr. J. E. Howard, F.R.S.).—Before calling upon Mr. Callard to reply, I wish to say that I think, while on the one hand we ought not to overstate, we should on the other be very careful not to understate the value of negative evidence. There can be no doubt that it is of great value as a defence; and, when the doctrine of evolution is put forward, the more pugnacious it is, the more fair is it that the negative argument should be used against it. The paper we have heard, whether we accept altogether its deductions or not, is one well worthy of careful consideration. I think the onus of proof lies so entirely with the evolutionists, that the line of argument adopted in the paper is a very fair one. It is for the evolutionist to prove how the Glacial period is to be got over, and it also lies with him to prove why it is that we do not find a sort of sliding scale of fossils. We find, as it were, a certain number of milestones, and we assume there is a roadway lying between them. If we are sure they *are* milestones, I grant the inference. We find the remains of various creatures, which Professor Huxley took it for granted were the progenitors of the horse; but I think it is rather for him to show why we do not find the intermediate links. If you dig about London, you will come upon the remains of the former inhabitants from the time of the Romans, but with no distinct breaks between, so that you may assume London to have been continuously inhabited; but if I found merely Roman and Tudor coins, and none other, it would not be fair to assume that there had been a continuous inhabitation of London between the two periods represented by those coins. If, then, we are to adopt the continuous hypothesis of evolution, using the term in the sense that all living phenomena are to be explained by a continuous process of evolution, without cessation, and with no assistance from without, I say we have a right to require that these breaks shall be explained. It certainly does not necessarily involve a denial of creation by Divine Power to believe that some form of evolution played a part in it, but I confess that I should like to have strong proof of the evolution theory before accepting it. Well, then, I say before we adopt the doctrine of evolution, which Mr. Callard is opposing,—the doctrine which assumes a continuous succession of evolutionary changes by a process of natural selection,—we may fairly ask for some explanation of these very inconvenient breaks. A proposition in Euclid would be very difficult to understand if we only had some of the syllogisms before us, and we had to find out the others. I do not say the deficiencies would show that there was no argument; but I think we ought to suspend our judgment till we found out the missing links somehow.

Mr. CALLARD.—I have been much interested by the way in which my paper has been received. I did not expect that the doctrine of a complete break during the Glacial period would be at once accepted. I know that a good deal might be said about it; but think, if I have an opportunity at another time of saying a little more upon the subject, I shall be able to prove to you that the glaciation of the northern and southern hemispheres was simultaneous. We have not time to go into that proof to-night; but I would ask, what leads you to suppose there was a glacial condition on one hemisphere and not on the other? Until Dr. Croll's hypothesis came before the world no one ever thought of such a thing. Darwin, when he wrote the fourth edition of his "Origin of Species," saw no way out of this glacial difficulty; and he is entirely indebted to Dr. Croll, who came forward just in time to help him.* Dr. Croll's hypothesis is that the eccentricity of the earth's orbit will give a certain period of glaciation for each hemisphere. Is it so? The eccentricity at the time assigned to the last Glacial epoch was ten and a half millions of miles; that does not mean that the earth was ten and a half millions of miles further from the sun than it would have been in a circular orbit, but five and a quarter millions of miles further at one part of its orbit and five and a quarter millions of miles nearer to the sun at the other part of its orbit. I fancy that any mere common-sense person, looking at this, would require a little further explanation before he could see how this alteration could produce the Glacial period. Dr. Croll said that this would not do alone, it would only be the hemisphere that has its winter solstice at a time of great eccentricity that would be so glaciated. It is a question whether the distance from the sun would have made any difference at all; but, if it be granted that it would, the northern hemisphere, which was supposed to have had its winter solstice at the greatest distance from the sun, would, when it came to the other side of its orbit, get its summer when nearest to the sun, so that, if an increased cold is obtained in the winter when in aphelion, it has, on the other hand, an increased heat at the time it is in perihelion: how this could produce the Glacial epoch I am at a loss to see. Mr. Croll says, there would be a cool atmosphere in summer from the melting of the snow and ice, and, on account of this, the earth would pass through a hot summer without feeling the heat. But this is merely begging the question. We have not got the snow and ice, to begin with; we know that it is not one winter's cold that would produce the Glacial period, and that what winter would do in one part of the earth's orbit the summer would undo in the other.† The difference in climate referred to by Mr. Griffiths, within one hundred miles, was occasioned by difference of altitude; and the Indian corn to which he alludes, Mr. Darwin says, has its roots in ancient glacial moraine. Mr. Mello's letter refers to there being evidence of certain of the fauna living from the pliocene to the present time. I expected that question would be raised, and no one could deal with it better than our friend, Mr. Charlesworth. He is a thorough geologist, and I remember how in this room he dealt with the pliocene badger, which was supposed to have been one of those animals which existed in the fauna of both strata—the pliocene and the pleistocene. Mr. Charlesworth, however, showed that the badger had merely worked his way into a pliocene quarry. What really is the evidence of pliocene forms now living? Does the evidence come from the ossiferous caverns ?* If so, we know that evidence from this source is very uncertain. Professor Dawkins says, with regard to these caverns, that it is impossible to tell with certainty their precise relation to the Glacial period. If it is impossible to tell this, we must be left in doubt about glacial survivals. And I do say that those who hold to the hypothesis of evolution would require to bring evidence of more than a few forms living through the Glacial period to account for a new fauna. Every species now living should have had living representatives in the pre-glacial period, seeing that there was not time during the Glacial epoch—for which 160,000 years is claimed—for evolution, according to the views I am dealing with, to produce the multifarious changes required by the hypothesis. If these changes have not been produced during the post-glacial times, and if they could not have been produced during the Glacial period, then all the animals we see around us—the dog, the horse, and all the other multitudinous forms of animal life—must have had representatives in the pre-glacial period. If, therefore, I should have two or three forms pointed out in which my deficiency in palæontological knowledge causes me uncertainty about their stratigraphical position, Mr. Charlesworth will, perhaps, be able to remove the difficulty, as he did in the case of the pliocene badger. But to come to the question of negative evidence: I say that there is no evidence of there having been mammals (land mammals) in the cretaceous period. Mr. Charlesworth says that this is but negative evidence—mammals may yet be found ; and, in drawing a parallel with his own experience in the Suffolk crag, those present who are not geologists might understand Mr. Charlesworth to mean that Suffolk crag is cretaceous. If, in the Geological Society, I were to venture, in Mr. Charlesworth's presence, to say that there had been mammalian life in the Laurentian rocks, I think he would stare at me. But why should I not say so ? He would say, "We have never found any." I reply, "No, but perhaps we may in the future." Would not Mr. Charlesworth say, "You must not talk about these mammals having existed in that period till we have seen some evidence of it?" Well, I say precisely the same thing to him about the cretaceous system. If you are prepared to put Darwin's theory of evolution on the shelf until you have found the mammals, I am content.

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* "It formerly appeared to me that we could not avoid the conclusion that the temperature of the *whole world* had been *simultaneously* lowered during the Glacial period."—*Origin of Species*, fifth edition.

† See *The Geological Evidences of the Antiquity of Man re-considered.* T. K. Callard, pp. 16–26.

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* In the lower deposit, at the entrance to Victoria Cave, Settle, there was found the remains of a fauna beneath glacial clay. It was the same deposit in which the supposed fibula of man was discovered, and which led to the supposition that pre-glacial man lived in Yorkshire. The argument that claimed man as pre-glacial would equally apply to all the fauna in that deposit. Amongst this fauna were eight out of the fourteen forms said by Mr. Pattison to be pre-glacial, and two out of the four forms so claimed by Mr. Mello. As the evidence at first stood, all the forms in that deposit would be correctly claimed as pre-glacial. In 1876 I visited the cavern, and (for the reasons assigned in a paper read before the Victoria Institute), I satisfied myself that the glacial clay covering the animal remains was *remanié*,—a re-deposit at a later date. Both Professor Dawkins and Professor McKenny Hughes expressed the same conviction at the conference held in 1877 to consider the present state of the question of the Antiquity of Man. Great care is needed in receiving evidence from pleistocene fauna respecting their pre- or post-glacial position. Dr. David Page, in his *Text Book of Geology*, points out the difficulty of fixing with certainty the limit of the pleistocene system.—T. K.

The meeting was then adjourned.*

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* Since the meeting took place, Dr. Darwin has passed away; and it may be permitted to quote the following from a periodical entitled the *Champion of the Faith*:—

"It is with the sincerest sorrow that we write the words, 'Darwin is dead.' We can ill afford to lose so earnest a student of nature, so gentle a spirit, or so honest a man. We all owe him a debt, the greatness of which we can scarcely realise. He has revealed to us the habits of countless creatures, whose apparent insignificance caused them long to be overlooked, his almost last legacy having made even worms objects of admiring interest. . . . . We cannot accept his creed, or agree with his inferences in the matter of evolution, as we consider them illogical; but, though they should all hereafter be proved erroneous, that would not detract in the slightest degree from his fame as a naturalist. It would only show that his acumen as a logician was not equal to his insight as an observer. . . . . Atheist he assuredly was not; he could not even be ranked amongst Agnostics, for again and again he speaks of the 'Creator,' and the 'Creator breathing life into one or two primitive forms,' as also of the 'ennobling belief in God.' It would be wise if some of those who call themselves his followers tried to copy his earnestness and his modesty; but as disciples frequently travesty the teaching, and ignore the spirit of their masters, so do many Darwinians manifest an *odium scientificum* that Darwin would have severely condemned. Anger in controversy is an absurdity. Facts will live though all the world should combine to howl them down. Fictions will die though all the world combine to try and keep them alive. Whatever has been true in Darwin's life work will live; whatever has been mistaken will die, and we are persuaded that no man would more rejoice at the death than Darwin."

ORDINARY MEETING, May 15, 1882.

Rev. R. Thornton, D.D., V.P., in the Chair.

The minutes of the last meeting were read and confirmed, and the following elections were announced :—

Member :—Rev. C. H. Sutton, M.A., London.

Hon. Local Sec. :—Rev. S. D. Peet, United States.

Also the presentation of the following works for the library :—

"The Christian Philosophy Review."	*From the Institute.*
"Christian Positivism." Rev. G. Blencowe.	*Ditto.*

The following paper was then read by the Author :—

DICTATORIAL SCIENTIFIC UTTERANCES AND THE DECLINE OF MODERN THOUGHT. By Lionel S. Beale, F.R.S.

THE inquiry whether the hypotheses upon which modern scientific opinion in favour of some form of the physical doctrine of life which constitute the basis of every kind of materialism are or are not worthy of acceptance at this time, has called forth very different replies. Some in authority have answered with a positive and unhesitating affirmative, others have given an uncertain assent, or have contented themselves by not dissenting. A very small number have objected to the physical view of life as untenable in the present state of scientific knowledge, and as being, upon various grounds, unworthy of acceptance. In this minority I still find myself, because, notwithstanding full inquiry, and very careful examination concerning conclusions arrived at by others, I am obliged to confess that I feel more strongly convinced than ever, that all the physical doctrines of life yet advanced are quite untenable. Some of the reasons which have led me to draw this conclusion shall be set forth in this paper, while many more have been already given in works and memoirs which have been written by me during the last twenty years. The general conclusion which, as it seems to me, a careful and candid examination of the facts which bear upon the question compels an unbiassed thinker to draw, is that no form of the hypothesis which attributes the phenomena of the living world to mere matter and its properties has been, or can be, justified by reason.

Unlearned people have been flattered by having been, as it were, taken into the confidence of certain authorities of materialistic tendencies, and assured that, as science is but educated common-sense, they are well able to judge concerning many deep scientific questions of consummate interest to every person of intelligence, and that, therefore, they will feel convinced of the truth of recent conjectures on the physical nature of life. Materialistic doctrines have now been taught for so many years that they have come to be looked upon as a sort of belief, or faith, which ought to be at once accepted by all who desire to be considered, from the materialistic point of view as reasonable persons. Any who should be so rash as to inquire concerning the exact meaning of the terms employed would be, of course, altogether beneath notice, as they would prove, by the doubt they implied, that they belonged to that large group of unteachable persons not included among the wise, the learned, or the cultured.

Instead of the hypothetical suggestions in favour of the physical doctrine of life, advocated by materialists and others, resulting from a legitimate flight, or extension, of the imagination into the border-land which lies between the extreme limit of observation and experiment, and that region which gradually passes into the Unknown and Unknowable, it will, I think, be found that they are almost entirely sustained by mere assertion, and by authoritative declaration, while careful study will convince that they are not sanctioned by the facts, observations, and reasonings, which constitute the science and philosophy of the time in which we live.

Positive conclusions have been drawn concerning questions of momentous consequence not only to curious and scientific people, but to mankind at large, and have been advocated with a confidence which precludes doubt, and reiterated with a pertinacity, which is calculated almost to enforce acceptance.

But few of those, who are carried along by the materialistic stream, have troubled to think over the remarkable tenets to which they have given their assent. They receive with a faith, called robust, which seems so blind and unreasoning as to border on credulity, dogmatic and dictatorial conjectures of the most extravagant kind, convinced, but not by reason, that the authors of them could not be mistaken in the views they advanced with such positive and undoubting emphasis.

The reception of materialistic dogmas by any intelligent person who takes the trouble to think over their terms, and is capable of appreciating, and analysing, and examining the evidence upon which they are supposed to rest, is simply impossible; and the applause with which these views have been received in some quarters is to be accounted for by the decline of thought, and the indisposition on the part of the public to trouble to think at all on the merits of the arguments presented to them. Is there one acquainted with the powers and actions, and results of living, of any form of living matter, who will declare that he believes the doctrine that non-living matter alone is the source of all life, and will state the grounds of his belief?

Bear in mind that no state of matter known, no mere chemical combinations, no mechanical contrivances, no machinery ever made, can be caused to exhibit phenomena resembling in any really essential particular those which are characteristic of every form of living matter that exists in nature, and which, we must infer, have characterised every particle that has ever existed since the first appearance of primitive life on the earth.

Neither can any known form or mode of ordinary energy construct or form, direct, control, or regulate. Nevertheless, it is taught far and wide that vital actions are due to the energy which belongs to ordinary matter, and that, therefore, vital action is but a modified form of ordinary physical or physico-chemical action. Vital action, it is said, differs in degree only from actions which occur in the non-living world.

As regards the nature of that remarkable process of growth which takes place in all things living we find great diversity of opinion. Some, indeed, maintain that growth is not a vital process at all, but that it essentially consists of the aggregation of particles of matter; nevertheless, no one who regards growth as a physical operation has appealed to any definite case of growth to show that the intimate changes which occur are really of the character he asserts. The growth of a leaf, for example, seems to be very widely removed from the mere aggregation of particles of matter.

In all growth we have a process essential and peculiar to all life, which is confined exclusively to the living, which does not characterise any form of non-living matter whatever. But *growth* is but one of several vital phenomena absent in all non-living, present in every kind of living. It has been asserted, and is now ordinarily taught, that crystals *grow*. Between the so-called growth of a crystal and the actual growth of a particle of living matter there is, however, no true analogy.

Herbert Spencer, strange as it may seem, affirms that crystals *grow*, and that non-crystalline masses of various kinds *grow*. He declares that the accumulation of carbon on the wick of an unsnuffed candle is an example of *growth*. On the other hand, he states that the living shoots from a growing potato are not an example of growth. Now I desire to direct your attention to this part of Herbert Spencer's work because he endeavours to convince his readers of "the essential community of nature between organic growth and inorganic growth." There, will be found some of the very remarkable inferences upon which his system of evolution in part rests, and which may be clearly proved to be erroneous. Indeed, not a few of the assertions he makes may be answered by a direct contradiction, with advantage to the cause of truth. Non-living things do not *grow*, as he affirms, while all living things and every form of living material *does grow*, although, he says, with respect to a living plant, that its increase is not *growth*. The case of the potato, which he affirms not to be *growth*, is really as good an instance of growth as can be obtained in nature. Now, if I can persuade any disciple of Herbert Spencer to explain and defend his utterances in the first two pages of this chapter of part ii. on the "Inductions of Biology," I think much advantage would result. A careful examination of this chapter will enable any intelligent person to see how the idea of community of nature sought to be established between the living and the non-living is defended by this author. The so-called *growth* of the non-living masses differs absolutely from the only true *growth* which is peculiar to the living world, but universal in it. Now vital growth has never been explained to this day, and cannot be explained on chemical or mechanical principles, or imitated in the laboratory. The *growth* of the most minute particle of living matter is, as I have stated, a vital process, and is due to the operation of a force or power absolutely distinct from ordinary energy and from every form of force of non-living matter. Every kind of aggregation is absolutely distinct from growth, and does not involve the latter. Processes of aggregation may go on to all eternity without the occurrence of any change resembling, or allied to, that of growth. *Growth*, after all, is but one of several purely vital phenomena.

Surely it is the duty of all persons having any pretensions to culture, who esteem accuracy and truth, and desire to promote their diffusion, either to condemn the materialistic doctrine as scientifically untenable, or to insist that more accurate and adequate explanation of the facts and principles upon which it is based should be given by those who have unreservedly committed themselves to the universal application of this physical hypothesis of life, and that some reply should be made to the objections that have been raised to its general application to living things.

I would draw attention to the declaration again and again repeated, and now taught even to children, *that the living and the non-living differ only in degree, that the living has been evolved by degrees from the non-living*, and that the latter passes by gradations towards the former state. No one has adduced any evidence in proof of these conclusions, which are, in fact, dictatorial assertions only, and no specimen of any kind of matter which is actually passing from the non-living to the living state, or which can be shown to establish any connexion between these absolutely different conditions of matter, has been, or can be at this time, brought forward.

You will, I think, find that, in endeavouring to prove the reasonableness and strength of the doctrines they have espoused, the advocates of every form of materialism mainly rely upon the assumed applicability to matter that lives, of conclusions arrived at concerning the nature of the phenomena of non-living matter. But the fact, That this living matter, as is well known, is invariably derived from matter that already lived, is a serious difficulty which presents itself to the mind at the outset of the inquiry, and which, instead of receiving some explanation as regards its bearing upon physical views of life, is on account of its inconvenient tendency generally ignored. Materialism, indeed, rests upon this assumed intimate alliance and relationship between the living and non-living. But as soon as the knowledge of the peculiar and special nature of all vital actions shall be better known and more widely spread, and when people shall have learnt how absolutely the vital are marked off from purely physical and chemical actions, belief in materialism will be shaken, and this antiquated creed will then only retain the support of a few faithful adherents wedded to the old paths and ancient ways who have not heart to desert the old beliefs, evolved in the infancy of thought and philosophical inquiry. Were their reason allowed to do so, it would probably lead them towards a goal of a very different nature. It is, indeed, strange that one of the chief means relied upon for the purpose of convincing people of the truth of materialism should be to institute comparisons between things which are alive and have gradually grown—from the infinitesimal, transparent, structureless—into form and bulk, and lifeless machines which have been made in pieces and afterwards put together; and to assure the public that these two utterly distinct things, living beings and machines—nay, machines made by man, and not capable of being produced in any other way—were very much alike, and belonged to the same category. It would be tedious were I to repeat the dictatorial utterances in argumentative form which have been published far and wide for the purpose of leading people to believe that a living thing was like a watch, or a steam-engine, or a hydraulic apparatus. Moreover, some of the comparisons have been voluntarily abandoned by their authors in favour of others even more absurd. Such tricks as calling a watch a *creature*, and a man a *machine*, are hardly likely to mislead even the most ignorant after they have withdrawn themselves from the bewitching influence of the persuasive eloquence of the materialist prophet, and have commenced to calmly think over his extraordinary utterances, in order to extract any meaning that may be hidden by the frothy metaphors of modern physico-vital conjecture.

The very last comparison made for the purpose of helping people to understand the nature of a living thing is, I think you will say, the very worst and most inappropriate ever suggested—one that, as you will perceive, must be rejected, not only because it is quite inapplicable, but because the thing with which a living being is compared is so distorted and so changed that it is no longer what it has been called—nay, in the terms adopted it is not even conceivable by the imagination. This last thing which it has been said a living body is like is called an army, but, as I shall show you, some essential characteristics of an army have been taken away, and some impossible characteristics arbitrarily added, which would reduce a hypothetical army to that which could no longer be correctly termed an army; and as some of the characters superadded are absolute impossibilities of nature, the whole comparison comes to little more than incongruous, unintelligible metaphor, or incoherent rhapsody, which may amuse the fanciful and thoughtless, but which ought to be condemned, by all capable of thinking, as extravagant and misleading, and as likely to hasten the decadence of thought.

Let me beg of you not to allow the mind to be diverted by fanciful comparisons and asserted resemblances of the living to the non-living, from the careful consideration of the real differences between that which is alive and that which is not alive. This question of difference or resemblance between vital and physical will be found to underlie some of the most important speculations of our time, and I cannot too earnestly draw your attention to the very great importance of insisting that the facts and arguments advanced by materialists should be clearly stated so that they may be thoroughly sifted, and fairly discussed, instead of vague assertions in favour of wide generalisations being accepted without examination or inquiry. If examined, not a few of the conclusions will, I am sure, be dissipated at once, for they will not stand the test of careful analytical exposition.

It is not to the credit of the science, or the philosophy, or even the common-sense of our day, that broad and far-reaching doctrines of the kind alluded to, and which involve inferences of transcendent consequence concerning the present, past, and future of all things, should be accepted without examination, taught far and wide even to babes, and presented in a clever and inviting guise, and made to appear as if they were actual and generally received truths, to be accepted by all who wish to be considered to be progressing with the times, while in reality the doctrines in question are mere conjectural opinions founded on vague and insufficient data, with nothing whatever to recommend them save authoritative assertion. Such doctrines would have little chance, were it not for love of extravagant novelty and the decline of thought.

It must, I think, be admitted that in science, as well as in some other departments of human endeavour, there is at this time far less freedom of thought as well as of discussion than is necessary for intellectual progress. Real advance is in these days too often thwarted by cliques and caucuses whose chief business it seems to be to manufacture "public opinion," to create "tendencies of thought," and thus prevent, or render nugatory, the intelligent examination and criticism of the doctrines established and spread. Besides this, the prejudices of the unlearned are sometimes flattered, and the applause and indolent acquiescence of mere numbers eagerly sought for. Many of those who support materialistic doctrines, are too lazy to think over the principles upon which the doctrines they are persuaded to accept are based, nor are they able to estimate the consequences which the general adoption of such speculations would involve. The exercise of a sort of terrorism has led to people being frightened into a sort of confession of faith in some absurd dogmas, the threatened penalty for refusal being that of being numbered amongst the fools, the bigots, the orthodox, and the like.

Some who accept fancies of the most conjectural character as new articles of belief, which involve the abandonment of old truths as well as the sacrifice of firm bulwarks of belief, seem to reluctantly yield a regretful but conscientious submission to the stern dictates of truth, and pose as if they were exercising a self-denying virtue, possibly not unalloyed with pity, nor quite free from contempt for those who still hopefully cling to the beliefs of their fathers. Nevertheless, if you will take the trouble to thoroughly investigate the principles of the new faith, you will be convinced that all that can be obtained by the most careful analytical examination of the foundations upon which different forms of new materialism rest, are dogmas about forces and properties, hypotheses as to what may be, or might be, or must be, and a robust faith, which you are requested to have, in wonderful discoveries which are to be made after the lapse of some time by privileged spirits who, it is asserted, will make their appearance in the future.

That a materialistic and antitheistic view of things may present itself to some minds, and assume what seems to be a reasonable form is, however, possible; but the pretentious vapourings in philosophical phraseology familiar to us, and which are supposed to tend towards that by not a few much-to-be-desired consummation, are often but a poor parody on materialism, and a real disgrace to the critical and reasoning power of our time. Some of the assertions which have been made about the properties and potencies of matter, and which are repeated even in text-books, would not survive candid answers to the questionings of a curious schoolboy.

The popular scientific doctrines of the last few years all seem to admit some vague, imaginary, non-existing first cause, of which neither the nature nor the attributes have been defined, and which is placed at such a remote distance in time from the present era, that in us it can hardly excite more interest than the possibility of a shadowy phantom in an all-pervading primitive mist. There seems to be a fanciful conception of material atoms being evolved from the void; but it is, of course, useless to ask why, when, or how? By one supreme mysterious fiat, or effort, beyond, above, and independent of all law, eternal forces and properties were conferred upon these atoms, I suppose, at the moment of their evolution from the nothing, by virtue of which they restlessly gyrate. The vibrations communicated to atoms by the first impulse then came under law, and in obedience to laws supposed to have been enacted in the first beginning, still continue their movements, and being acted upon by, and acting upon other atoms, actions of the most complex character are established. Gradually these actions are supposed to take the form of life, and as the ages have rolled on, living forms have assumed a higher character until, at last, the evolution of man himself was consummated. Of all things the farthest removed from the remote cause of his existence, man, the only being in nature longing to know of law, of cause, of consequence, is commanded to see grandeur, and more than grandeur in the fanciful suggestion of a creator of molecules of cosmic vapour out of which earth and air and water, and every form of matter, non-living and living, were, according to the hypothesis, gradually formed, or evolved themselves in obedience to some compulsory arrangement, or not to be accurately defined necessity, or "law," supposed to have been enacted for once and for all by the Creator in the first beginning, and still causing everything and operating on everything up to this very day.

The materialist needlessly, and without reason—or, rather, against reason, as it appears to many—sneers at the want of enlightenment of past generations, and in his own dogmatic, and self-confident, infallible way expounds the materialistic views of the existing order of things; extols the tendencies of what he calls the thought of his time, by which he seems to mean materialistic dogma, and prophecies concerning the proofs of the truth of his teachings which are to be discovered by unborn materialistic investigators. His hearers listen with wrapt and unquestioning reverence to his vague and extravagant utterances. They cannot doubt; they dare not think. Have not gifted mechanisms of the highest culture spoken? have not privileged spirits of transcendent power prophesied? Who, then, fit to survive, can doubt—who dares to disparage the glorious grandeur of the universal, ever-moving molecular mechanism?

How often are we enjoined with austere solemnity not to resist the influence of the cold logic of materialistic science? We shall be spurned by many, but we must be encouraged by the conviction that we are acquiring material truth, and sustained by the consolation that, though we may be looked down upon, we may feel certain that we alone are right. We are not only told how we must look at nature, but precisely what we are to see is most accurately described, exactly as it has been discerned by the materialistic intellect and caused to assume a form fit to be received by the people at large. The moving forces and molecular mechanisms have been revealed.

Nature herself has been discovered. And a very pretty nature, indeed, is the materialistic nature which has been embodied by authority, and held up for the contemplation and admiration of mankind. Instead of the benign nature of the Epicurean, which gave to all, which made all, and which provided for all, we have a benighted nature in the shape of a blind, insatiable, relentless, irresistible fate, falsely called law—working like a dull, senseless machine of overwhelming might, maiming, crushing, distorting, destroying, and thus continuing and preserving,—destitute of intelligence and reason,—devoid of justice and mercy. A nature not contributing to the happiness or enjoyment of any, working upon a world peopled with machines and continued by the destruction of the products of ever-recurring, ever-failing, unintelligent, undesigned experiment. A nature whose law is in part worked out by length and strength of tooth and claw. A nature which must be detested by the good, and despised by all who can think, and see, and reason. Such is the natural world which is held up for our admiration with the consoling assurance of dictatorial authority that it sprang from chaos in obedience to everlasting self-originating (?) law, and that it will return to chaos, in obedience to the same,—all life and work and thought being but the undulations of cosmic nebulosity, and dependent upon the never-ceasing gyrations of infinite, everlasting atoms, as they bound through the ages from void to void.

This, the dullest, the narrowest, the most superficial of all creeds—materialism, which includes some mixture of antitheism and atheism of various forms and hues—has been half accepted by hundreds of persons during the last few years. I believe all materialistic doctrines, vary as they may in detail, will be found to agree in accepting as a truth—if, indeed, they are not actually based on it—the monstrous assumption that the living and the non-living are one, and that every living thing is just as much a machine as a watch, or a windmill, or a hydraulic apparatus.

According to the material contention, everything owes its existence to the properties of the material particles out of which it is constructed. But is it not strange that it never seems to have occurred to the materialistic devotee that neither the watch, nor the steam-engine, nor the windmill, nor the hydraulic apparatus, nor any other machine known to, or made by, any individual in this world, is dependent for its construction upon the properties of the material particles of the matter out of which its several parts have been constructed? Who would think of asserting that in the properties of brass and iron or steel we shall find the explanation of the construction of a watch? It has been often affirmed in positive and dictatorial language that the formation of the animal is due to the properties of the particles of which its body is composed.

There can be no doubt that of late years there has been an intense desire on the part of many people to be assured that there was no absolute or essential difference between the changes taking place in living things and in non-living matter, and this idea is supposed to add grandeur to the conception of the unity of universality. The desire has been abundantly gratified. The assertion has been made again and again, and it is being continually repeated and emphasised, but, strange to say, some incredulous sceptics doubt whether, after all, the assertion is literally true. They listen, they admire, they repeat; they even try to persuade themselves and others that the assertion is true, but still they doubt. Many, though they are assured of the analogy between hammered iron giving out heat and the brain, sensation, are not quite convinced. The too frequent repetition of a scientific statement seems to beget doubt in sceptical minds concerning its accuracy. If, as it should do, the doubt excites a determination to carefully examine the foundation upon which the doctrine of the identity of physical and vital phenomena rests, the conviction of the utterly untenable character of the hypothesis will be forced upon the mind of the inquirer, who will afterwards be on the side of the opponents of the faith in the unity of non-living and living.

Many persons of intelligence cannot but admire materialistic unity, and are anxious to be convinced that the non-living and living are really one, and that the phenomena of the living world are due to the properties of matter as much as are those of the non-living world. The simplicity of the idea is convincing. Persons of this persuasion do, in fact, accept materialism in faith, but, above all things, they desire that their doubting faith should be fortified by robust reason. The desire has not been gratified, and, in fact, not a few are troubled by doubt. Those who think over the matter do not wholly believe, though they wish they could believe that they are mere machines. They cannot call to mind any machine which grows as they have grown, while all the machines they know anything about have been made in pieces, which have been put together afterwards.

When people begin to think, they will soon see how absurd it is to maintain that growth and the actions going on in living beings are due to the properties of the particles of matter of which their bodies are composed. A little reflection will make it obvious enough that neither the formation nor the action of the watch, or the steam-engine, or the windmill can be due to the properties of the matter of which the machine is made, but that formation and action depend upon the manner in which the parts are fashioned and put together and made to work. And, of course, the suggestion will occur to those who think that, if all these machines were to be destroyed and pounded to pieces, the matter would still retain its material properties, although no one could then discover that it had ever taken the form of a watch, or an engine, or a windmill, any more than a chemist from a thorough examination of the mere matter and its properties would be able to premise that it would one day take the windmill, watch, or other form. But, however severely faith in materialism may be shaken by thought, its admirers may take comfort in the consideration that, although to their uninformed intellects much may seem doubtful, uncertain, and strange, the high priests of materialism could unquestionably explain all, and make everything clear, if they deemed it desirable and to the advantage of the millions to do so at this time. The final and complete materialistic revelation is to come in good time.

"Protoplasm" and "Physical basis of Life" have entered into many dictational utterances, and the words must by this time be familiar to every one. But if we endeavour to ascertain the exact meaning which is attached to the words, and try to make an accurate estimate of their value with regard to the new light supposed to have been thrown by their use upon the question of the nature of life and the relation of non-living to living matter, we shall find that our task is not an easy one. Protoplasm, it is said, is the physical basis of life. The moving matter in the hair of a nettle, or in a cell of vallisneria, the moving matter of the body of an Amæba or a white-blood corpuscle, white of egg, boiled white of egg, muscle, roasted and boiled muscle, boiled lobster, are, it has been said, composed of protoplasm and constitute the physical basis of life. Upon the molecular changes taking place in these different forms of matter, life, it has been affirmed, depends, and all of them, it is said, are composed of "molecular mechanisms."

No one can attentively study the statements, and apply his mind to the examination of the assertions which have been made, without observing that the same name, protoplasm, is applied to matter in essentially different states. Living matter is called protoplasm; dead and boiled and roasted matter is also called protoplasm. Living matter, dead matter, and roasted matter are all the physical basis of life. That which is not only dead, but has been dead for a long time, is the basis of *life*. The matter of a living thing which is alive at the time is also a "*physical basis*." That which is alive is a physical basis of life, and that which is dead is equally a physical basis of life. Such is the reply made to the question, What is the difference between living matter and the same matter which has ceased to live? Such is the method by which it is shown that the difference between the living and the non-living is not a difference in kind, but in degree only. Such is the method by which people have been misled and confused. It is, of course, mere idle trifling of the most transparent character. But few persons have taken the trouble to carefully examine the statements with the object of discovering exactly what was the meaning the author intended to convey. Many, perhaps the majority of readers, are content to catch the words, without troubling themselves to ascertain what meaning ought properly to be attached to them. Perhaps they feel much confused, and, not liking even to think disrespectfully of the writer, they persuade themselves that the full consideration of the question is beyond the province as well as the capacity of busy people engaged in the ordinary work of life, and that, therefore, they must accept without inquiry the assertions, as the authoritative utterances of gifted spirits.

Such views would have little chance of being received, or even tolerated, had they not been advanced at a time which was remarkable for the decline of thought, and for the dislike or fear of examining and analysing authoritative statements.

The phrase "undifferentiated protoplasm," as contrasted with "differentiated protoplasm," is now often used. Children are asked questions about it in elementary examinations, and yet no exact meaning has been given by any one to the terms, and the sense in which the words are often used is incorrect. The "differentiation" of protoplasm is one of the cant terms of the time, and is supposed to explain a great deal, while it only deceives and confuses; for instead of differentiation being an explanation of change, or the cause of change, as is implied, it is really only a way of stating a fact. If it is correct to call the undifferentiated matter protoplasm, it cannot be correct to call the differentiated matter by the same name, because the first exhibits phenomena absolutely distinct from any manifested by the last.

Let us endeavour to keep clearly before our minds the paramount importance of the answer given by the science of our time to the question, "What is the difference between living matter and the same matter in the dead state?" If it can be proved, as declared in many scientific dictatorial utterances, that the difference is molecular, mechanical, or chemical in its nature, then must things living be included in the same category as non-living matter. The living and non-living in that case will truly be one; then would be established the much longed-for Unity; then would materialism rest on an intelligible basis, and constitute the foundation of a popular if not a progressive creed.

But the science of our day has given no answer of the kind. On the contrary, all investigations so far carried out lead to inferences of an opposite tendency. So far from the gradations asserted to exist having been proved, not a vestige of anything tending towards proof has been discovered. No difference in kind so consummate, no divergence in property so wide or so absolute, can be pointed out in nature, as the difference which subsists between a minute particle of matter in the living and the same in the dead state. The difference remains to this day as irreconcilable, inestimable, absolute, in every sense as it ever was; while there is no reason to suppose the difference will be less in time to come.

Now, let me ask you to consider for a moment the movements which affect every form of living matter while it is alive, which cease with its death never to recur, and which are absolutely different from any movements of non-living matter which are known. In many instances so active are these movements that they can be seen and studied under the microscope by any one who chooses to take a little trouble. Although the observer may not be a trained microscopist, he will see enough to satisfy him that the movements are not like those of any ordinary matter. It is true that movement occurs in all kinds of matter non-living as well as living, but the movements of the molecules of non-living matter are one thing, those of living matter another thing altogether. The former belong to matter as matter, and occur in the particles whether alive or dead. The latter continue only as long as life lasts. It has been authoritatively declared that living movements differ from non-living movements in degree only, and not in kind. But any one who studies the movements of living matter soon becomes convinced that they are different in kind from any non-living movements, inasmuch as they begin and cease under circumstances which would not affect the movements of non-living matter, while the very matter which exhibits the living movements will exhibit non-living movements after it has ceased to live. The materialistic doctrine of life, instead of resting upon facts of observation and experiment, rests upon assumptions of the most extravagant kind, and the facts of nature are too often distorted and made to bend to the requirements of artificial and ridiculous creeds resting on authority only.

Thoughtful persons must be surprised that the constant repetition, without any attempt at proof, of such assertions as, that all living things are mechanisms, mere machines, and that in the living matter of their bodies there is molecular machinery—does not of itself lead to the exposure of the extreme weakness of the materialistic view. For is it reasonable to suppose that the ardent advocates of materialistic doctrine would be content with vain repetitions if they could explain and illustrate their assertions so as to make them intelligible? Would they not offer remarks concerning the *sort* of machinery they say exists? Would they not tell us how it appeared, something about its structure, the way in which it was put together, the mode in which it was dissolved and renovated, the means by which it was made to act? Would they not have something to suggest concerning the forces or powers by which the working of the machinery was directed, and the probable source of these, as well as their ultimate fate? Would they not, if they could have done so, have given diagrams of the molecular machinery of their imagination for the instruction and edification of their less learned and weaker brethren? But, instead of this, all that men of this persuasion seem able to do is to repeat again and again the same monstrous assertions, That living matter and non-living matter differ only in degree, and that the action of living matter is due to molecular machinery. But, besides giving to non-living matter molecular machinery, the capacities and powers which the living alone possesses are sometimes given to the molecules of inorganic matter. Professor Huxley, for example, goes so far as to affirm that these inorganic molecules have the power of "sensitively adjusting themselves." Indeed, one would not be surprised if it were discovered that certain molecules which had acquired advantages over others arranged themselves in such positions as would enable them most successfully to jostle weaker molecules and take the places they were the fittest to occupy.

That such vague notions should be accepted by any but a few enthusiasts who knew nothing of the facts would be surprising; but that such very imperfectly considered conclusions should be accepted by many and become really popular, indicates that there is somehow a demand for them—a desire or determination on the part of people to receive them—a longing to believe them, and a conviction that they will be proved to be true—a determination to rely upon mere authoritative declarations, and to have their thinking done for them instead of thinking for themselves. Such are some of the indications of a decline of thought.

The public are nowadays assured that the phenomena of the living world are due, not to *life*, but to the molecular constitution of the matter of which the bodies of living things are composed. Ere long, however, people will find that little consolation, or information, is to be gained from the molecular constitutions that may be, and then they will perhaps be content to be brought face to face with the facts as they are, and will see that the conclusion, That matter became endowed with vital power *after, and perhaps very, very long after it had acquired its molecular constitution*, is more in accordance with the facts of nature than the assumption, That all living forms are due to non-living properties, and that no powers whatever have been communicated to matter and no direct metabolic influence exerted, since its first creation.

It is not now easy to get a hearing for arguments in favour of views concerning the nature and action of living things which in any way conflict with what happens to be the current opinion of the time. The educated public has much to answer for as regards the unmeasured support it has for years past given to speculative thought of a most one-sided character, as well as for the tyranny it has permitted and encouraged, and still allows to be exercised towards any who put forward conclusions which happen to be opposed to the fashionable dogmas of the day.

Can applause or great popularity afford any excuse for the unfair way in which many popular authorities have put the question of vital actions in living things before their hearers? The alternative view is almost invariably represented as an absurdity, or a perverse misrepresentation of the facts. The extent to which mere intellectual trickery is carried in these days is marvellous; but so few people think over what is affirmed by teachers very popular at the time, that the most astounding absurdities receive a sort of acquiescence, and long escape the exposure they deserve. Those who differ from materialists are credited with believing in all sorts of nonsense, and are said to stand upon the ancient ways, while, in point of fact, these professors of materialism—in their style, in their method of procedure, in what they teach as new—are truly most antiquated, for they are really trying to make the world go back more than two thousand years, in order that it may gain the inestimable advantage of reverting to a faith compared with which Mahometanism is advanced, indeed.

In his address to the Medical Congress, Professor Huxley tells the assembled medical and scientific men that "the simplest particle of that which men in their blindness are pleased to call 'brute matter,' is a vast aggregate of *molecular mechanisms performing complicated movements of immense rapidity and sensitivity* (!) *adjusting themselves* to every change in the surrounding world. Living matter differs from other matter in degree and not in kind; the microcosm repeats the macrocosm, and one chain of causation connects the nebulous original of suns and planetary systems with the protoplasmic foundation of life and organisation."

Professor Huxley has been continually propounding and putting forward conjectural utterances of the kind during the last twenty years, and it is surely now time that something more substantial should be brought forward in support of the dogmas than conjectural chains of causation. Just think over the paragraph I have read, and try to extract from it any sense it may contain. We are told that "the protoplasmic foundation of life and organisation" is connected with "the nebulous original of suns and planetary systems," by "one chain of causation." Can an individual be found who will undertake to defend or to expound these nebulous utterances? If they amuse, they will certainly delude and mislead an audience. Here is an example of what is considered good for the purpose of advancing scientific education. That talk of this kind should be deemed likely to enlighten the medical profession, or assist in any way to advance medical education, is most extraordinary.

It is not pleasant to have to differ from Professor Huxley, for not only has he a multitude of enthusiastic admirers, but he is himself a master in the use of very robust language, particularly when he deigns to refer to people who do not agree with him. Some who are unable to accept as the exact truth what he affirms to be truth have been spoken of as bigots, and it is possible that some other epithets may yet be found to still more decidedly characterise people who are opposed to his doctrines. Only the other day it was said that a truth which, according to Mr. Huxley, had been "trodden under foot, reviled by bigots, and ridiculed by all the world," is "only hated and feared (!) by those who would revile but dare not!" Professor Huxley likes the word "revile." To say that people who differ from you revile you is, undoubtedly, an ingenious way of getting out of a great difficulty. When you are asked to explain what you mean by some very confident dictatorial utterance, and if you feel that you cannot do so, there is nothing like accusing your opponent of reviling.

Any evolutionist who has a question put to him which it is inconvenient to answer, and which it would be imprudent on his part to discuss, is "reviled." But, whatever the consequences, I shall venture to make some remarks on a few of Professor Huxley's recent utterances, even at the risk of being also condemned as a reviler.

What do you think of the attempt to convince people of the similarity or identity or close relationship between non-living matter and living matter, by calling a non-living particle and a living particle a "molecular mechanism," and by further asserting that non-living matter can be resolved into "molecular mechanisms," and that living matter will also be resolved into "molecular mechanisms?" Huxley tells the Medical Congress that matter is an aggregate of "*molecular mechanisms* performing complicated movements of immense rapidity, and *sensitively adjusting themselves* (*!*) to every change in the surrounding world." But fancy giving to a particle of lead or iron this power of "*sensitively adjusting itself.*" Is there any one in the world, besides Professor Huxley, who would apply such language to non-living matter? By giving to the non-living the attributes peculiar to the living, Professor Huxley succeeds, according to his own satisfaction, in breaking down the contrast between living and non-living matter; but will any one else believe that anything of the kind has been done?

Is it not almost a disgrace to the thought of our time that such transparent fallacies and absurd misrepresentations should not only be allowed to pass without comment, but receive the sanction and approval of many scientific men? Again, Professor Huxley tells the Medical Congress that vital actions are "*nothing but* changes of place of particles of matter." What vital action in this world is *nothing but* a change of place in particles of matter? The statement seems not only unsound, but unfair. To say that any vital action *is nothing but* a change of place of material particles is surely absolutely incorrect, for not only are all vital actions much more than this, but physical actions are more. It is obviously the something more than mere change of place that makes the difference between one form or kind of action and another. If there was *nothing but* change of place, it is clear there would be but one action in the universe, instead of infinite variety of action.

Qualities and properties are by materialistic authorities attributed to matter or denied to matter, as may be convenient; but any attempt to explain the difference between a particle of living matter and the same matter when it has ceased to live, is carefully avoided. It is suggested that the only difference is a difference in the rate or degree of activity of the molecular mechanisms of which matter dead and matter roasted and boiled, living, not living, of every kind and form, and in every state, is composed. The matter which consists of molecular mechanisms includes, of course, simple and compound substances. Iron, oxygen, a particle of roast mutton, and a particle of living matter, are all included in one category. All consist, according to Professor Huxley, of molecular mechanisms; but the molecular mechanisms of some of these things must consist of more elements than those of others, and the mechanisms of the living protoplasm are surely capable of movements of a character totally different from those of the oxygen. Moreover, it is certainly remarkable that the molecular mechanisms of all forms of "protoplasm" should contain the same four elements. By abstracting one or more of these, the molecular mechanisms of protoplasm would be destroyed, and yet molecular mechanisms of some kind or other would remain. Mr. Huxley does not tell us how we are to distinguish the simple molecular mechanisms from compound molecular mechanisms, nor how the molecular mechanisms of a simple substance like lead differ from those of a compound like his protoplasm. It would seem that the molecular mechanisms of lead are, according to this hypothesis, as much alive as the molecular mechanisms of living protoplasm, but that the latter are more active than the former. They differ in degree, but not in kind.

Professor Huxley must surely have formed a rather low estimate of the intelligence and critical power of the medical profession, to expect them to be convinced by him that the only difference between living matter and non-living matter is a difference of degree. He asserts that there are complicated movements in the matter of which all living and all non-living matter consists. And, without one word of explanation as to what he means, he tells an audience, consisting of highly-educated men from every part of the world, that "the microcosm repeats the macrocosm, and that one chain of causation connects the nebulous original of suns and planetary systems with the protoplasmic foundation of life and organisation." Is thought, I would ask, to be silenced by such nebulous nonsense as this? So far from anything like a chain of causation having been shown, not two links of such supposed chain have yet been discovered. But the whole chain of causation which connects nebulous originals of suns and planets with protoplasmic foundations is of so nebulous a nature that it scarcely deserves notice. "The microcosm repeats the macrocosm," says Professor Huxley; but, the more this metaphorical utterance is thought over, the more difficult does it seem to be to get any definite meaning out of it. What particular minute living thing or microcosm is in the least degree like the world, or like the universe? In what respects, for instance, does a monad or an amæba resemble the world? Surely it is time that people of intelligence should really consider what is gained by vague utterances like the above. We have had during the last fifteen or twenty years no end of materialistic suggestions, prophecies, and promises, but little besides incoherence and inaccuracy have as yet been established. One wonders what the representatives of medical science of all nations thought when they were assured that the microcosm repeats the macrocosm, and what meaning was attributed to these words by those who heard them.

The word "like" has been very curiously employed by many physical authorities, and, strange to say, in many assertions to which I could point, "unlike" would be nearer to the exact truth, as, for example, in the following dicta, *unlike* ought to be substituted for like:—Man is *like* a machine; man is *like* a monkey; living matter is *like* white of egg; a living thing is *like* a watch, and a windmill, and a hydraulic apparatus; the body is *like* an army. Now, if any one will point out the respects in which these things are alike, I have no doubt some one will be found who will point out in what respects they are unlike, and then the public will be able to decide which of the two words, *like* or *unlike*, is more correct.

"Vital phenomena," says Professor Huxley, "*like* (!) all other phenomena of the *physical* (!) world, are resolvable into matter and motion." Here, as in many other cases, Professor Huxley begs the question. The assertion that vital phenomena belong to the physical world is not to be justified by demonstrated facts. No purely physical phenomena are like any purely vital phenomena. How can vital action be of the physical world when it appears and disappears, while the matter with its physical properties still remains? Between the *motion* of the particles of living matter and the *motion* of particles of non-living matter there is all the difference imaginable—an essential, an absolute, an irreconcilable difference. Materialists, of course, assume and assert the contrary; but, instead of wasting time by assertions, why do they not adduce an example of movements occurring in some form of non-living matter exactly resembling those which occur in living matter? Much of our scientific teaching is now intensely and ridiculously dictatorial. Instead of persuading people to consider and admire natural phenomena, and to think over the wonders around them, some scientific authorities think to spread their views, by threatening to place all who do not agree with them in a class, in which nobody likes to be included, however large it may be.

Professor Huxley, with that curious partiality for contradictory statements which distinguishes many of his utterances, condemns in one place the idea of an "indivisible unitary archæus dominating from its central seat the parts of the organism," and in another tells us that "the body is a machine of the nature of an army." Every army to be of any use must, of course, be under a head of some kind or other, but Mr. Huxley's army has no general or indivisible unitary archæus of any kind. Each soldier is, I suppose, to govern himself under inexorable laws enacted when everything was in the state of primitive nebulosity. The army of Professor Huxley is, as we shall see, the most marvellous of all nebulous machinery yet discovered by materialists.

Now let us admit for a moment that the body may be compared to a "machine" of the nature of an army. How does the comparison help us to understand the nature of the body? For is not the army actually composed of a number of machines of the very same kind as that body machine which is said to be like it? What, therefore, can be gained by the comparison? Obviously nothing would be gained by telling people who wanted to learn about the nature of a sheep that it was like a flock of sheep. But the body is a machine of the nature of an army, and the microcosm contains the macrocosm, and, therefore, possibly the body, according to Huxleyan logic, contains the army. But I may be wrong, for it is not an *army*, but *a machine of the nature of an army*. We have machines of the nature of a watch, machines of the nature of a windmill, and machines of other natures, but the machine which the body is like, is of the nature of an army. But this last "machine" is essentially different from all the other machines because it is composed of living men while machines in general consist of non-living materials. In short, Professor Huxley uses the word machine just as he uses the word protoplasm in speaking of that which is living as well as of that which is not living!

But Mr. Huxley's "machine of the nature of an army" shall be further examined. It will be found to be very peculiar indeed, whether it is compared with machines or with armies. The army of Professor Huxley would not be recognised as an army by any general, or by any soldier in existence. This remarkable army has "its losses made good by recruits born in camp." This is an excellent idea for increasing the number of soldiers, and may be recommended to the War Office.

In the body "each cell is a soldier," says Mr. Huxley. If so, I suppose each cell has the power of acting, of displaying intelligence, of obeying the word of command, and carrying out the orders of the general. In a few sentences further on, as well as in many papers he has written, he deprecates this view altogether, and talks about vital actions being "nothing but changes of place of particles of matter," and he looks forward to "the analysis of the living protoplasm itself into a molecular mechanism." The body he regards as "a synthesis of innumerable physiological elements," each of which may be described "as protoplasm susceptible of structural metamorphosis and functional metabolism."

After all our work, all our chemical, physical, and microscopical investigation—after all that has been gained by most minute and careful anatomical investigation carried on for many years, Mr. Huxley comes forward, and, in the most public manner possible, tells the world that the body is not like a watch, or a hydraulic apparatus, but an army—but such an army as never has existed and never could exist— an army not to be conceived by the imagination, an army beyond all powers of reasonable conjecture; an army, the fighting power of which would be destroyed not only by the birth of its recruits, but by the necessary phenomena which would precede that interesting event. But, alas! this is not all, for this army cf Professor Huxley's, strange to say, is unfit to survive, for does he not tell us that it is certain of defeat in the long-run? Professor Huxley's army is not an army at all, but only an imaginary heterogeneous collection of nebulous impossibilities. It is scarcely credible that such suggestions as those I have criticised could be seriously made in the presence of hundreds of representative medical and scientific men from all parts of the world. You will, however, find them on p. 99 of vol. i. of the *Transactions of the International Medical Congress.*

And what end is served by such comparisons? Are we taught anything by such incongruous metaphors? In what particular is any living thing like a watch, or a hydraulic apparatus, or an army? There is not one of the ridiculous comparisons which have been made which helps any one to form an accurate notion of the nature of any living thing in existence. Half the utterances of this kind serve but to confuse and lead the mind away from the truth about life and the phenomena peculiar to living things. That all this loose, rambling talk concerning questions which can only be determined by observation, experiment, and reason, should be listened to by intelligent persons, is but evidence of the decay of thought and the general love of submitting to the dictation of a tyrannical, materialistic coterie, which, being at this time very popular, attempts to arrogantly dominate over sense and reason.

He who studies any living thing in existence at any period of its life, or the smallest portion of any form of living matter, will soon be convinced that it would not be correct to say that it was like anything else in nature, except some other form of living matter. For it will be found that certain phenomena which characterised the particular living particle characterise all living particles of which we have any knowledge or experience. Further investigation will convince an inquirer that vital phenomena are not comparable with any phenomena belonging to non-living matter. They are, in fact, peculiar to living matter. Between purely *vital* and purely *physical* actions not the faintest analogy has been shown to exist. The living world is absolutely distinct from the non-living world, and, instead of being a necessary outcome of it, is, compared with the antiquity of matter, probably a very recent addition to it—not, of course, an addition of mere transformed or modified matter and energy, but of transcendent power conferred on matter, by which both matter and its forces are controlled, regulated, and arranged according, it may be, to laws, but not the laws of inert matter.

It is not only one or two of the positions assumed by the materialist that are open to doubt or objection. The whole contention is, and has been during the last twenty years, utterly untenable, because facts have been known which completely controvert all materialistic views which have been put forward. Mere popularity, it need scarcely be said, goes for very little, unless the facts and arguments urged in favour of the doctrines can be shown to rest upon evidence. Neither is it a question of much consequence how confident individuals may be who countenance or endorse the hypothesis, That any vital action in nature is due to physical forces only. Nor can concurrence of opinion on the part of even a large society, or a tendency of thought, however marked, be accepted as conclusive. What is required is, that the arguments advanced in favour of this view should bear the test of examination. Instead of this being the case, many of these arguments have been over and over again conclusively shown to be worthless; and a critical examination more thorough than that to which they have been hitherto submitted will certainly be so much the more demonstrative of their worthlessness. It is utterly unreasonable to assume, as has been continually done, that the laws which govern vital actions are the very same laws as those which all non-living phenomena obey. There is not at this time a shadow of evidence in favour of such a contention. It rests only upon pure assumption, and is one of the most reckless and most unjustifiable of the many untenable assumptions to be met with in the history of thought. It is opposed to facts of common experience and observation, as, for example, the growth upwards of a tree; but this as well as other facts have been explained so as to fall in with the assumption.

It may be freely admitted that if we attribute to vital power certain phenomena of the living world, which have not been, and cannot be, explained or accounted for by any physical laws yet discovered, we thereby assume an agency which we are unable to isolate or demonstrate, and the existence of which we cannot in any way prove. On the other hand, it is only fair to observe that, if we assume that phenomena peculiar to life will some day be explained by physics, we certainly act in a manner which is not sanctioned by science—we assume, we prophesy, and prophetic assumptions of every kind are contrary to the spirit of science. But, if we accept the dicta of many popular teachers, and assert that these vital phenomena are, indeed, physical, we assent to a proposition which has been actually proved untrue, and which has been shown over and over again to have no foundation, in fact, experiment, or observation. Nevertheless, it may be urged that it is no more incorrect or against the spirit of science to assume that a physical explanation will be discovered at a future time, than to assume that the phenomena are due to a force or power which we cannot isolate, and the nature of which cannot be demonstrated. But is it not in accordance with reason to assume the existence of a peculiar power to account for phenomena which are peculiar to living beings, which differ totally from any known physical phenomena, and which cannot be imitated—and is it not contrary to reason to prophesy that such phenomena will one day be explained by ordinary forces or powers? Notwithstanding all the tremendous efforts which have been made by intellects the most robust to persuade themselves and others of the promise and potency of the molecular mechanisms of their imaginations, up to this very moment, nothing which in the least degree justifies their positive assertions has been discovered. Nothing like a vital phenomenon has been explained by physical science or imitated in the laboratory.

The simple truth is that the essential phenomena of all living beings cannot be explained without recourse to some hypothesis of power totally different from any of the known forms or modes of energy. Any one who allows his reason to be influenced by the facts of nature as at present discovered will feel obliged to admit the existence of vital power as distinct from, and capable of controlling, the ordinary forces of non-living matter. It has been conclusively shown that the laws of vital force or power are essentially different from those by which ordinary matter and its forces are governed. My own views on this matter, put forward during the last twenty years, have, of course, been ignored by materialistic prophets; but it is satisfactory to find that now and then the word *vital* is actually used in speaking of phenomena, not to be explained by physics and chemistry, by some scientific men who, nevertheless, support the doctrine that vital is, after all, but a form or mode of the ordinary physical action of non-living matter. The fact is, those who act thus feel the weakness of the cause they advocate, and try to hide their confusion by vagueness and obscurity of expression. Within a very few years, the hypothesis of molecular machinery will probably be forgotten, and the operation of vital power, as distinct from any ordinary force of matter, will be generally admitted and taught.

Purely vital phenomena are manifested by every form of living matter from the highest to the lowest. They are temporarily resident in matter which has been derived from matter in the same state, and when once vital phenomena have ceased they cannot be caused to recur in the same particles. Although it is frequently alleged that there is only a difference of degree between the changes in living matter and those in non-living matter, no one, as I have stated, has been able to support this proposition by facts and arguments, or to adduce one single example of matter in any state which illustrates the asserted gradations of change from the living to non-living, or from the latter condition to living. The more we learn concerning the ordinary properties of matter the less probable does it appear that these properties will ever be found adequate to account for the facts of living. How can any reasonable person expect that the disposition of the materials used in the construction of any apparatus or organism will be adequately accounted for by a demonstration of the properties of the materials themselves? Material atoms in living things are made to take up certain definite relations with respect to one another which no experiment has shown to be due to, or to depend upon, properties associated with the matter. Nor is it even conceivable that property which is unalterable should determine movements and the formation of structures which change from time to time, and the form and exact character of which last must have been foreseen and prepared for from the very beginning. The act of construction, the arrangement of material particles according to a definite and pre-arranged plan and for a special purpose, can no more be attributed to the properties of the matter in the case of a living being than in the case of a watch.

The advocates of materialistic doctrines do not offer a suggestion as to the precise changes which occur when what they deem to be merely a compound substance containing oxygen, hydrogen, nitrogen, and carbon, and, possibly, one or more other elements, passes from the living to the non-living state. The new materialists stand alone among all the sects known to history in not being able, nay, in not attempting, to establish their views by arguments or to support their doctrines by appealing to facts and reason. They content themselves with authoritative declarations of the most positive and solemn kind, but which, from a scientific and philosophical standpoint will be pronounced by dispassionate critics absurd and contrary to fact, and, therefore, not creditable to science. They command people to believe, and encourage them to have robust faith, but as for evidence in support of their materialistic tenets they have literally none. If people generally were acquainted with the facts revealed by the microscopic examination of living matter, and would allow their minds to be influenced by what they observed, they would no more believe in the dicta of the materialist than give their faith to an authority who declared that the earth was flat.

The general acceptance of materialistic doctrines is, in itself an indication how little thought is given by most people in these days to the importance of inquiring into the nature of the evidence upon which far-reaching conclusions they too readily receive are supposed to rest. People have been misled in times past by false teaching, and large numbers have become steeped in ignorance, bigotry, and fanaticism. But I do not believe that the most lamentable instances on record have led to results more disastrous, or more likely to prove injurious to the interests of individuals and possibly to nations than this attempt in our own time to establish the weakest and worst form of materialism ever advanced, is calculated to produce in the future. It is bad enough when numbers of people become converts to a system founded on truth more or less perverted, or misinterpreted, owing to the ignorance or mistaken zeal of its exponents; but the evils resulting are evanescent and harmless indeed as compared with those which must result from inculcating a system which professes to be founded on reason, but which really rests upon fictions and arbitrary assertions,—a system in which fact is appealed to, but is not to be found. Look at it how you may, you will not discover the smallest speck of firm ground of truth upon which to build any form of the materialistic doctrine. The phantom of possible molecular mechanisms,—confusion between mere energy and the power by which it is directed, between a machine and its maker, between designing and making in form and order and for a purpose, and the mere purposeless piling of particles of matter one upon another, or their equally purposeless falling down, are a few of the erroneous comparisons frequently made and accepted as if they were compatible with reason, and even trophies of recent scientific conquest.

By materialism it is sought to reduce vital phenomena to mere attractions, repulsions, affinities, and to annihilate the idea of vital power. Materialism can only be sustained by the suppression of truths and by ignoring facts that are known, and by a most fantastic and reprehensible system of using the same word in very different senses, and in applying the same term to things which widely differ from one another and even exhibit opposite qualities. By intellectual devices which are certainly not creditable to intellect, the absolute and irreconcilable difference between the *non-living*, and the *living*, and the *dead* are ignored by some, and denied by others; *difference of degree* is substituted for *absolute difference*, while *identity* is not unfrequently made to do duty for *diversity*, and *like* is used where *not like* would be more correct.

The CHAIRMAN (the Rev. R. THORNTON, D.D., Vice-President).—I feel some little reluctance on this occasion in asking you to present your thanks to Dr. Beale for his very thoughtful and interesting paper; because, if I were to do so, I should be asking you to draw upon yourselves the wrath of those whom he attacks, and expose you to being called "bigots." (Laughter.) Now, the word "bigot" is a very terrible word indeed, and I do not like to run the risk of having it applied to you. The meaning of the word in Spanish is "whiskers," so that you will see I have very little bigotry about me, and our lady friends none whatever. (Laughter.) But I am afraid we cannot fall back on etymology. The fact is, that the term bigot is used nowadays to signify a person who holds certain opinions and sticks to them because he has good reasons for doing so; and, such being the case, I have no difficulty in asking you to acknowledge yourselves bigots by thanking Professor Beale for his very admirable paper. (Applause.) We shall be happy to hear any one who would like to address us upon the subject; but, as time is precious, I must ask those who do speak to be good enough to keep themselves closely to the point, and to make their remarks as brief as possible. I presume I may thank Professor Beale. (Applause.)

Rev. F. C. Cook, D.D.—I merely wish to put this point. Can any man say that he has ever seen the mechanism of a molecule? If no man can say he has seen molecular mechanism, is it not, I ask, in itself a huge assumption?

Mr. C. J. W. Pfoundes.—An illustration occurs to me with regard to one who had attained some considerable notoriety. It is stated that at one time, when addressing an admiring circle of his friends, he was laying down the law, in the egotistical and dogmatic manner which is the wont of the particular class of persons to whom Professor Beale has alluded; he informed his audience how he occupied his time, from early morning until late at night,—how he devoted every moment of his waking hours to some special purpose, until the disciples who surrounded him began to look upon him with awe; at length, however, one of them, less reverent than the rest, exclaimed, "But, sir, you have not allowed yourself one moment to think!" This seems to me to be pretty much what we find, in the case of most of the specialists of whom we hear so much, whose ability we cannot doubt, and whose energy and devotion to their hobbies no one would be disposed to revile. In driving their several hobbies along the narrow grooves to which they are confined, they seem to be quite oblivious to many important things. As a searcher after knowledge, and one who has battled against difficulties at home and abroad for many years, I have been very much disappointed on coming home, and hearing some of our great men speaking in public, on scientific matters; and have had occasion to feel anything but confidence in some of the statements made, especially on matters of every-day life, —statements which I have known to be erroneous. When I look around and see the results of the fallacies which the scientific world (of course, speaking generally) puts forth, I am bound to express my great disappointment, and say that modern thought is indeed going in a direction which impairs the intellectual and moral elements in mankind. I am sorry to say, that many of the professors who come before the world seem to be guilty of what is neither more nor less than dishonesty. They distort facts, in order to bring them into their own narrow groove, for the bolstering up of some point that may be under discussion at the moment. There are many points connected with the subject that would have been very interesting to discuss, could we have had a copy of the paper beforehand. I had expected to hear a little more about the decline of modern thought, rather than so much in the way of combating the specialists of the time; and I regret that something has not been said more directly showing wherein the decline of modern thought is to be noted. In our modern schools we find some attempt made to teach the classics, but nothing seems to be done with the view of turning the wisdom of our ancestors to practical account. Everything in the way of education nowadays is "cram," and as soon as a student has been "crammed" sufficiently to enable him to "Pass an Exam," he goes out into the world and there is no further effort to cultivate thought. This is one of the things that require attention; for, in these days, when everything is measured by its immediate return, there is great danger in neglecting the culture of intellectual thought.

Mr. F. Wright.—I was sorry to hear the last speaker refer to what he termed the dishonesty of many of our professors of science. During the last twenty years I have made myself familiar with pretty nearly all that has been written by Professor Huxley and Professor Tyndall, and nearly all that Professor Beale has written, and I am bound in common candour and fairness to say I have never yet detected dishonesty in any of these writers. We need not go so far for an explanation of the defects which have been so admirably pointed out by Professor Beale. I must admit that I have never seen those defects made to appear so flagrant, or so mercilessly dealt with as they have been to-night. I am willing to own that with respect to some of the points that have been dealt with I should like to re-consider my views; but, subject to this, I wish to place before the meeting one or two considerations in bar of the broad conclusion Professor Beale has invited us to accept. His broad conclusion is that the evidence in respect of the development of materialistic ideas is evidence of the decline of thought. Now, I do not think it gives any such evidence. First of all, I put it to you that he has brought before us only one aspect of thought, and has confined himself to one set of men. If we take a wider view, the matter assumes a less serious aspect, and we see that what these men have done in this respect may be looked on, if compared with the general work they have done in other departments of science, as little more than a diversion or amusement.* Both the names cited here to-night are those of men who have done honour to science, and the memory of whose work will live for centuries after the idle dreams which we have heard exposed are forgotten; but what these gentlemen have done,—these great contributors to the intellectual movement of the present age,—is that, along with their laborious endeavours in the pursuit of important scientific truths, they have placed before the reading public, as if they were established theories, what cannot and ought not to be deemed anything more than idle, dreamy hypotheses, and mere starting-points for further inquiry. (Hear, hear.) This is the great fault of the present day, and it is partly due, not, I think, to wilful dishonesty, but rather to enthusiasm of temperament and the association of an ambitious imagination with great knowledge and habits of close inquiry. I think there is nothing in more striking contrast than Professor Huxley earnestly and eagerly expounding an individual scientific truth, and the same man advancing a number of truths strung together in the form of a plausible hypothesis. The man in his two aspects is a totally different man; and what I say with regard to Professor Huxley is equally true of Professor Tyndall. There is in both these men, along with keen intellectual power and great knowledge, a most dangerous imagination; and not only this, but both have a remarkable power of exposition which I do not think I overstate when I say that it often completely runs away with them. All of us who have ever attempted to write for the public, and who have permitted ourselves to become enthusiastic on a theme upon which we have long meditated and in which we have become deeply interested, and have felt the glow of composition as we have found ourselves making a great point in a nice rhythmical, beautifully-rounded sentence,—all of us, I say, will remember how hard it was to strike that sentence out, though perhaps we may not have been able to see any great amount of sense in it. (Laughter.) I, for one, plead guilty to having passed through this experience, and when I catch Tyndall or Huxley writing such a passage I turn the page to see what I can come upon on the other side, saying to myself "This is a man to be neither followed absolutely, nor put aside lightly." (Hear, hear.) Having said this, let me also say that the fault is not all on their side. It is very much on the side of the public,—I mean, the reading public. We are living in an age which is very peculiar. I do not think there is any decadence of thought; but there are ten thinking now where there was only one thirty years ago, and from many of those who do the thinking for us we are getting very poor stuff. We are setting large masses of the people reading, and all they require is a general idea of things given in a plain form so that it can be easily grasped, and when they get this they are satisfied and cry out, "What a clever man! so clear! so convincing! so logical!" And what follows? Why, nine out of ten,—of course all here belong to the "one" and not to the "nine,"—fall down and do worship. We put the author on a high pinnacle; he is a Professor; we applaud and follow him blindly, worshipping him as these men have been worshipped by the great mass of mankind, and thus we spoil him. As long as we continue to follow him without question, ready to applaud his high-sounding sentences and accept his theories without having the courage to demand that he should prove his case, we may be sure that we shall be treated with the same sort of stuff we have been receiving for the last few years. There is another thing for which the public at large are also to blame. They do not laugh when there is plenty of cause for laughter. If some of the wild statements made by a few of our scientific men, instead of being implicitly accepted as they often are by the public, were only treated as they have been treated by Professor Beale,—that is to say, if we met them with a little sound intellectual chaff and ridicule,—we should soon chaff them out of existence. (Hear, hear.) We have the remedy in our own hands, and if, instead of dividing ourselves into two classes and dubbing this man as a theorist and that as orthodox, we were to analyse fairly, and debate, and consider the questions that are being discussed, we should very soon break up this sort of thing. It has not been going on very long. It is but a phase of the intellectual fever through which the suddenly-aroused mind of the nineteenth century is passing. How long that phase will last depends very much on the way in which we meet it. Personally I have been indebted more than I can express to Dr. Beale for having saved me from an abyss into which I should have fallen ten or twelve years ago had it not been for his writings. I had been captivated by the splendid imagery in which some of these materialistic writers have placed their views before us. But the work on "Vital Action" by Professor Beale brought me back from the dream into which I was falling, to where I was when I first took up Mill's *Logic* as a student and determined on following, fact by fact, line by line, and to accept no theory until it had been established. Professor Beale did me this service; and I am delighted on the present occasion to see him here and to be able to tender him my personal thanks. (Applause.)

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* But one often involving most serious issues, and then all the more open to criticism as coming from writers of such position and influence.—Ed.

Mr. J. Hassell.—I take it that the meaning of Professor Beale, in speaking of the decline of thought, is, not that there are no thinking men, but that the great mass of the public receive what is put before them without thinking. They accept the conclusions arrived at by scientific men, without endeavouring to ascertain whether they are true or not. I saw this exemplified a short time since at a meeting for the purpose of discussing the question of evolution. Many of those who took part in the discussion, instead of basing their conclusions on what they themselves had discovered, merely said that they accepted the hypothesis because Professor A and Professor B had said it was proved. Here, then, were men who, while they were capable of exercising their own minds, did not do so; and, more than this, they showed their narrow-mindedness by regarding as bigots those who thought it right to express a contrary opinion on the matter. For any one to say, "You must accept what Professor So-and-so says, or else you must be wrong," evidences, to my mind, a decline of thought, and this is what I take Professor Beale's meaning to be.

Mr. D. Howard, V.P. Inst. Chemistry.—There are few things more attractive than the unities taught by modern science. There is a great charm in the study of such propositions as the correlation of force and the conservation of energy, and in the reduction of astronomical truths to simple laws, but there are few things that ought to be more carefully guarded against than being carried away by the fascination of simplicity, and endeavouring to explain a thing by known laws before we have got to the bottom of what it is we want to explain. There is no subject upon which we are more liable to this danger than the problem of vital force, with regard to which Professor Beale has given us his warning. Certainly, it would simplify our conception of the matter if vital force were reducible to another mode of motion. It is, no doubt, very inconvenient that there should be such a material difference between Professor Huxley and boiled mutton (laughter); but somehow or other we do differ from pigs, or from white of egg. Chemists are undoubtedly unable to explain the difference between the elementary form of original substance which builds up organised bodies in its living and in its dead state; but I do maintain that it is an offence against the true Baconian method to assume that vital energy is only another mode of force. There is not the smallest proof that the cessation of vital energy produces the development of any other force that is measurable,—that the difference between the living and the dead is molecular motion. It was a reproach against the scientific men of bygone years, that they discussed the question of whether a living or a dead fish weighed the heavier; but the question was not so utterly absurd if we assume that vital energy is merely a form of molecular motion. I do not say it follows that if that were so it would affect the weight of the fish, but it would undoubtedly affect molecular motion in some direction. There must be a distinct, ponderable, or measurable amount of force expendable in some other way, and those who assume that the living and the dead are the same, are bound to get over the chasm which undoubtedly exists between the living and the dead, and show what is the force of which they speak, to measure it and show why it should not be expressed by foot-pounds as much as any other form of molecular motion. But I must say, that when we take the popular expositions of this question we are met by very ugly results. Not that ugly results justify bad science, but they make us strict in our inquiries as to what is bad science. There are many persons who, owing to the spread of science,—and it certainly is for the most part spread very thin,—teach a good deal more than they suppose. When these persons say that men are mere machines,—mere self-acting organisms,—they forget that the people they are instructing are quite sharp enough to say, "Then we are not responsible." (Hear, hear.) Perhaps I am getting beyond the philosophical and into the theological, if I say there is a deeper danger behind; "God is not the God of the dead, but of the living;" all faith in God, all religion, morality, and responsibility would be at an end if man were a mere machine. I do not mean to say that those who take different views from mine about vital force necessarily differ from me on these fundamental questions; but I do say to them, "Be very careful how you use the expressions so commonly employed; be very careful how you accept what, after all, are utterly unproved hypotheses,—even if they be more than vague metaphors—as to men being machines;—or you will find that a logical conclusion is drawn by those who are intelligent enough to seize any mode of escape from personal responsibility, and sharp enough to make a very ugly use of this freedom from responsibility." (Hear, hear.)

Mr. E. Charlesworth, F.G.S. (a visitor).—I hope I may be allowed, while paying the highest possible compliment to the author of the brilliant essay we have heard to-night, to say, with regard to the view he has taken of the decline of thought, that I differ from him *in toto*. I entirely agree with the observations so ably and judiciously put forward by Mr. Wright, and I think that so far from there being at the present day a decline of thought in progress, we ought rather to call this, *par excellence*, the age of thought. If we want to see the evidence of this, we have merely to contrast the tone of the current periodical literature of the present day with what it was twenty or thirty years ago. You can scarcely take up a periodical of high standing at the present time without seeing some article or other relating to modern thought. In fact, we have a periodical so called, which I think may be taken as the type of one special feature of our current literature. I agree also with the same speaker in saying, that, combined with this amount of thought, there is an undoubted tendency at the present day,—more than perhaps at any former period in the intellectual world,—to allow dogmatism to flourish in certain quarters. As a case in point, I may perhaps allude to that very remarkable feature of our researches in natural science which relates to the earliest forms of organic life on this planet: I refer to what has been said about the famous organism—if organism it may be called—the *eozoon canadense*. When Dr. Carpenter first came before the scientific world and told us that whole mountains of the bottom rocks, which are always looked upon as the rocks that produced the sources of life, are made up of nothing more nor less than forsaken life, every one bowed before him and believed what he said. But now, sir, by degrees, an entirely new phase has come over our thoughts in relation to this so-called early form of life in the bottom rocks. We are at length beginning to believe that Dr. Carpenter was wholly in error. For my own part, I will not go so far as to say that he was in error; but, at all events, the evidence is perfectly evenly balanced; and yet for some time the dogma of Dr. Carpenter completely triumphed. As a Fellow of the Geological Society, I am aware of the enormous amount of labour Dr. Carpenter has bestowed upon the subject. At one time there was a tendency on the part of men of science generally, to receive what Dr. Carpenter said—often without any investigation—simply because it came from him; now, however, a complete change is coming over the aspect of things, and many men of eminence are saying that Dr. Carpenter has made a grand mistake. It is one of the most unfortunate features of the present day, that there is so much bowing to authority. At the same time I must repeat, that this, perhaps, of all others, is the age of thought. I would only add, that I desire to tender my most sincere and grateful thanks to Professor Beale for the able and interesting paper we have listened to to-night. (Applause.)

Mr. W. Watkiss Lloyd.—A speaker has touched on the point that this is not so much an age of decline of thought as of decline of courage. In this I perfectly agree with him. He holds that we are apt to be dominated by dogmas, and this must be due to a decline of courage; for I do not think that thought, in any age, can be said to be in full vigour unless it is supported by a good deal of courage. This deficiency of courage with respect to the subject of the paper we have listened to is visible in two quarters,—it is seen among scientific men in the first place, and it is also evidenced among the public. I think there can be no doubt that we outsiders observe that scientific men are, to a certain extent, cowed by the force of the authority which resides on the side of the materialistic dogmas. There is a degree of prudence that will operate to check men in any particular pursuit; as Sir Walter Raleigh said, "If a man follows truth too closely at the heels, he may chance to have his teeth dashed out"; and there is a feeling also, that unless a person follows closely the current of what is popular and fashionable, he may ultimately find himself left very much in the cold and may suffer accordingly. I must say there is, to a certain extent, the same sort of feeling in the arts, if I may be allowed to refer to them in illustration. People feel that they must be in the fashion. Take the case of an architect. He may have a strong taste for the Classical; but people will have the Gothic style, and, much as he dislikes it, he finds that he must build Gothic houses. Love of peace degenerates into a want of courage on the part of the public, who bow to what they find to be in vogue. There is the same sort of feeling in other matters. A good many of us know what it is to be in a minority on political questions. You cannot open your mouth as one of the minority without finding that you are in an unpleasant position, and the result is that you hold your tongue. And this, I am afraid, is very much the case with regard to scientific questions. You trace it not only among the public at large, but also in the literature which addresses the public. Science, we all allow, has sustained a great loss in the death of Darwin, whose genuine services I may be allowed to say, though I am not a scientific man, will always be appreciated. But the advocates of the Darwinian doctrine have put it in the strongest way, that the theory of evolution is so absolutely established that no person worthy of consideration, no man in the scientific world, especially, can or does stand up against it for a moment. But we know that this is not the fact, and that there are truly scientific men who do not hold the Darwinian view. I was lately reading an article in the *Saturday Review* on the death of Dr. Darwin, and I took notice of a fact which I regard as evidence of the want of courage I have referred to. The writer, in referring as an adherent to the theory which we are told by Professor Huxley is absolutely established, still only spoke of Darwin as having made it exceedingly probable. Indeed, the word "probable" runs quietly through that article from beginning to end. Now, what, I ask, was this a sign of, but that the writer did not consider the theory absolutely proved, and at the same time had not the courage to say so emphatically? (Hear, hear.) I agree with a speaker who has addressed us this evening in so instructive a manner, that every one, even among the general public, ought to have the courage to speak out on these occasions, and, when he finds these things taken for granted, should ask one or two plain questions. In that case it would no longer be understood that the world at large, scientific and unscientific, is accepting, as established, theories which are simply ingenious hypotheses. There is no doubt that at the present moment scientific men are apt to be very much like inventors. As soon as an inventor has a happy idea he rushes off to take out a patent for it. It is pretty much the same sort of thing with some of our scientific men. A scientific man has got hold of a good idea, which he thinks may turn out to be true some day, and he at once announces it as a positive fact, in order to be beforehand with it; if it turns out to be all right, he is sure to be praised for his profound sagacity, and if it does not why, then, it will possibly last his time, and that is sufficient. (Laughter.)

Professor ODELL.—Professor Beale has shown us that materialism, with which he deals, is a cause of the decline of thought. I think, if we each asked ourselves the question, we should be unable to find a greater cause than that of materialism in producing this decline of thought.

The CHAIRMAN.—Perhaps, before Professor Beale replies, I may be permitted to say a few words as to the question of dogmatism; and on this point I think we must all feel indebted to one gentleman who has found a little hole in our armour. I am afraid that we of the Victoria Institute are rather apt to dogmatise a little ourselves, and I think we should be careful, as far as possible, to avoid this fault. It is, doubtless, very pleasant to be able to say in a sweeping manner, "You are wrong"; but we must guard against doing so, especially as we are so ready to notice that our adversaries are very apt to do it. We ought to weigh ourselves in the same scales as those in which we weigh our opponents. Perhaps I may be permitted to call attention to the distinction between the words "dogmatic" and "dogmatism." A dogmatic statement is a statement which is not hypothetical. When a truth is ascertained to be either demonstrable, or so highly probable that it is morally certain, we assert it dogmatically and not hypothetically, and there is no harm in such an assertion being made dogmatically. Galileo, for instance, only asserted hypothetically that the earth moved round the sun; but we, in the present state of astronomical science, are able to make the assertion dogmatically. It would have been wrong in Galileo to have asserted the fact dogmatically, and it would be wrong in us to assert it hypothetically. But dogmatism is a different thing, and means the assertion dogmatically of what we ought to assert hypothetically. When a man arrives at a certain conclusion and thinks it is true, he foresees the induction or other logical process by which he will prove it; and when, so thinking, he is able to prove it, he asserts it as proved, saying that others who differ from him are wrong; that is dogmatism. It is this that we should be very careful to avoid. We should guard ourselves against asserting a thing as proved until it is proved, and should not consider that anything is disproved until it is really disproved. (Hear, hear.)

Professor LIONEL S. BEALE.—I think the members of this Institute have been extremely merciful to me in the discussion of my paper, which I fancy contains some points that might have been criticised with much more severity than has been displayed in any of the remarks made to-night. Perhaps I may almost consider that I deserved such criticism; because in attacking some of the views that are put forward one is obliged to use pretty clear, and sometimes very plain, language, otherwise little interest is excited, and there is not much likelihood of a response. There is a certain number of assertions that have been put forward,—I will not place the word "dogmatic" before "assertions,"—by scientific men during the last few years, which undoubtedly do require, on the part of those who advance them, a great deal of explanation. I have alluded to several of these in my paper; I dare say I could easily find twenty, and I think I could find fifty, but I have not thought it necessary to do so. I have taken, as an example, the assertion that man is a machine and that all his actions are mechanical. Now, this is very imaginative, very pretty, and appears, at first sight, very clear; but, when we come to consider it carefully, it does not require much science to see that man is without any single attribute to which it is right to apply the word "machine." A machine has certain characteristics which are totally different from any a man can find in himself, and if he goes to those who have knowledge, and asks for an explanation, he will find that it is much nearer the truth to say man is not a machine, and has not a single action which can answer to that description. Of late years many such statements have been put forward, and they have excited much interest, not only among the public at large, but in such societies as this. It seems to me that the Victoria Institute may well take up some of these views and discuss them, as we have been discussing certain statements to-night, but going, perhaps, a little more into detail. I have had fault found with me for not putting forward arguments or stating the circumstances that have led me to make certain dogmatic assertions in opposition to certain other dogmatic assertions. It would take up the entire night to bring forward the whole of the facts that have induced me to draw the conclusions I have set forth, as against the assertion that vital action is merely a change in the form of energy. The question is, of course, a very large one. A good deal has been said and written about it, and there is a great deal more that might be said; but, as several speakers have remarked to-night, in this age, although it may truly be called the age of thought, we are certainly desperately tyrannised over. There can be no doubt about the fact that people naturally feel some diffidence in giving their opinions on such matters as I have dealt with, although their opinions may be right, and not only do they fear to give their opinions, but they are also afraid to discuss these subjects and ask questions upon them; for there is no more searching mode of discussing many of these matters than that of putting questions. For instance, it is said, that man is like an ape. Suppose I were to ask Professor Huxley in what points man is like an ape? Do you think he would answer me? No; he would try to put me aside; otherwise he would have to state where the resemblance lay, bone for bone, muscle for muscle. Then I should reply, "Take a bone; which bone will you have?" Then he would select a bone, and it would be easy to show that, instead of the two being alike, they are unlike. There is not a process, there is not an eminence on the bone which is not different from that which he says it is like. There may be a likeness in some places, but it is not fair to say that the two are alike. A great deal more might be said with regard to the same sort of language. It has been stated that I have been somewhat merciless; but the gentleman who thought so was so merciful to me, that I hardly like to criticise what he has said. The questions which I have dealt with are not mere evanescent notions, just passing through the mind; they are matters that affect people who think at all in a most important way, and some of the deepest ideas that exist in the human mind are unquestionably greatly influenced by the views an individual may thus be led to take as to the nature of life. The whole argument is a very long one, and can, of course, only be discussed in parts. I have dealt with a portion of it to-night, in the hope that I might be able to help the discussions of this Institute, rather than with a desire to ventilate my own views on the subject. With regard to the question of criticism generally, I would say, that if criticism should cease, scientific inquiry must unquestionably come to an end. Criticism is the soul of the whole thing, and I think Professor Huxley himself has said that it is the soul and essence of science. But people who venture to criticise are too frequently put down, and the result is that there are many men who dare not express their opinions. Many years ago I felt a certain amount of diffidence in doing so myself, and no one, from what I have written, can form a notion of the strength of the convictions I have acquired. One does not want to create a "to-do." Still, if any one likes to take up these doctrines, I see no harm in it, except where they are taken up on data which cannot be substantiated; and this, of course, is at least irritating and unpleasant to any one desirous of ascertaining the truth. But when it comes to being accused of being "orthodox," that, I must confess, is a thing I very seriously resent. Dr. Tyndall, I may mention, instead of answering some observations I had made, merely stated that they were the opinions of a Professor who was distinguished as belonging to a college well known for its orthodoxy. This sort of treatment is puerile, and no one likes to be answered in such a way. The fact is that every criticism I have made, and every word in the paper I have read to-night, might have been written by an atheist. There is not a sentence in what I have put forward that could convict me of any religious opinion whatever. I have dealt with the matter from a purely scientific point of view. What I say is, Let us treat these subjects simply as matters of reason and argument, and never mind to what conclusions we may be led. Let us have the facts on each side, and see which view is nearest to the truth. That is the way in which these questions ought to be considered; but it is not the way in which they frequently are considered. Certain statements are put forward in the most positive language, and a good deal of terrorism is exercised over those who presume to differ from them. This I regard as very unfortunate. All I want, and I am sure it is all which those who are on my side want, is fair discussion. Let every subject be ventilated to the greatest possible extent. I feel assured, as Mr. Lloyd has remarked, that there is a decided lack of courage, not only among scientific men, but also among the public at large; and it is due to this fact that there is much less discussion on these questions than there ought to be. (Hear, hear.) If societies like this were to take up and discuss subjects of this kind more frequently, they would do great good, and their discussions would excite great interest. All that honest people, who are working at these questions can desire, is, that they should be thoroughly ventilated and examined from every point of view. I am extremely grateful for the way in which the few remarks I have made this evening have been received, and, as I have already stated, I am doubly thankful for the merciful manner in which my paper has been treated. (Applause.)

The meeting was then adjourned.

ON THE NEW MATERIALISM.*

By Lionel S. Beale, F.R.S.

I propose in as few words as possible to ask those present to consider certain views bearing on the first principles of religion and philosophy which have exercised during recent years and continue to exercise an extraordinary influence upon the opinions held by many persons of intelligence. Acquiescence in the views in question, I think it will be found, involves the acceptance of ideas which are not consistent with one another, of doctrines which are contradictory, and principles which are incompatible or even mutually destructive. To give this fashionable confusion of doubt, denial, assertion, assumption, conjecture, prophecy, any name which has been already adopted by any philosophic or religious sect that has existed in the past, would be unjust, for the conflicting opinions now entertained cannot be formulated, and it is doubtful whether, among those who have consented to adopt them generally and vaguely, any two persons could be found who would agree concerning the elementary propositions on which anything like a philosophy could be established. Neither of the terms Rationalism, Materialism, Agnosticism, is strictly applicable to this most recent and most fanciful of all the creeds ever offered for adoption. To call it Rationalism would not be correct, for it does not rest on reason ; indeed it is neither reasonable nor rational. Materialism would be equally inappropriate, and no disciple of Epicurus would admit that it at all resembled the doctrine to which he had given his adherence. Neither the hypotheses, nor the assertions, nor the prophecies of the materialist of the new, would be recognised or approved by one of the old school. Agnosticism, again, would be a complete misnomer, for the advocates of this new philosophy profess to know all things and to account for all the phenomena of nature. They tell us not only the origin but the end of all. Commencing with cosmic vapour, they trace the evolution of all non-living and living, and discern the further changes which are to progress through a distant future until all again eventuates in cosmic mist. Those who know all this can hardly be denominated Agnostics.

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* Being an Address delivered in July by the Author, and specially revised by him for the Victoria Institute. It is inserted here by reason of its importance.—Ed.

One grand central principle of this new philosophy seems to be the assumption that what is not now capable of proof, but is affirmed to be true by its exponents, will be proved to be true by new discoveries which we are assured will certainly be made at some future time by the scientific investigations of that period,—among which discoveries is to be the proof of the confident assertion now so often repeated, and considered to be a cardinal point, that the difference between a living thing and the same thing when it is dead, which difference seems to ordinary comprehension so very remarkable as to deserve to be called absolute and insurmountable, is but a difference in degree. The evidence in support of various conjectures concerning changes in the properties of material particles and alterations in the character and properties of living forms is also supposed to be forthcoming at some future time. Upon the fanciful basis thus constructed out of what may be discovered in the time to come is raised a strange and grotesque superstructure of philosophical speculation, contradiction, and inconsistency, perhaps the most curious ever presented for the acceptance and admiration of mankind. Amid all the vagaries of the intellect are to be noticed the most ardent belief in and superstitious reverence for future hypothetical revelations.

Propositions which from their very nature must depend upon faith are rejected by the disciples of the new philosophy as unworthy of belief because they cannot be proved by observation, or put to the test of experiment, or the facts on which they rest be rendered evident to the sense of touch, sight, or hearing. On the other hand, things that have not been proved by observation, but which are within the limits of observation, which have not been demonstrated, but which would have been susceptible of demonstration had they really existed, are to be believed and at once accepted as literally true, because it has been affirmed by scientific teachers, who cannot possibly err, that all things and all phenomena are unquestionably due to the operation of laws of matter about to be discovered, and because certain views concerning things in general, and living things in particular, have been accepted by the established intellectual authority of the time, from whose decision there is no appeal.

The vague and most unsatisfactory hypotheses which are often accepted and believed in as if they were well-ascertained truths of science would have but little chance of acceptance but for the doubt and confusion of thought concerning fundamental principles of religion and philosophy which now prevail, and which, indeed, may be said to characterise the time in which we live. An incomprehensible yearning after breadth of view and an inexplicable terror of being accused of being bigoted and narrow-minded seem to paralyse the judgment and render some of the most intelligent amongst us infatuated victims of materialistic inspiration. The longing for ever-increasing breadth of view has led to the acceptance and teaching of doctrines which are contradictory and in some instances mutually exclusive. Conclusions which involve the denial of the existence of God are not unfrequently accepted at this time by persons who profess to believe the Christian faith. Incompatible and contradictory principles have been made to appear to harmonise by completely altering the meaning of the words employed, and it is doubtful whether any of the original meaning attached to certain most important words is now left. The word "God" is often used as if its whole meaning was comprised in creative power or first cause ; and, as to the word "Christianity," its meaning has been modified in so many ways of late that it would be most difficult to determine what is included and what excluded. In the time gone by Christian atheism would have been regarded as an absolutely impossible form of belief, but would it be quite impossible now to find persons ready, perhaps unconsciously, to justify the phrase Atheistic Christianity ?

Some would have us believe that all things living have resulted from the working and inter-action of the forces belonging to non-living matter only, and expect us to be convinced further that the above view of the conversion of the non-living into the living, in obedience to laws which govern matter only, is not inconsistent with the acceptance of the belief in one creating, designing, omnipresent, omniscient, omnipotent will. It has also been held that a God who only creates the Universe, which he then practically abandons, is equivalent to a living God that governs the world and ordains everything according as He wills,—not only the Maker, but the Preserver of all things. But is there no interval between the idea of a first cause originally creating matter and enacting laws for its subsequent guidance and arrangement, and the idea of an existing, living God who governs the world, to whom men may with reason appeal for counsel and guidance, whom they may obey, and to whom they are indebted for life, and health, and everything ? Does first cause comprise all that men imply when they speak of the everlasting living God ? Does creative power and law-enaction include all the attributes of the God of man ? If so, it is indeed, as has been suggested, a very small matter if by modern discovery the scene of the operation of the first cause is put back in a past somewhat more remote from our era than has been hitherto supposed to be the time of its activity. For in this case we should undoubtedly have, as has been suggested, a first cause to fall back upon, still a creator to acknowledge, a law-maker to reverence. But I would ask in all seriousness whether any form of the evolution hypothesis, which dissevers God from all that follows upon the primal act of creation, is consistent with serious belief in His existence,—in fact, belief in a *living God?* What man could worship, pray to, love, or adore such hypothetical first cause? I beg of you to consider whether this conception of the operation of a once-creating, once law-enacting first cause in a past inconceivably remote is an adequate substitute for the theistic idea which has been held for more than two thousand years. However positively some may affirm that the view objected to is not atheistic, it must be held to be of this nature unless the word is used in a sense which no one who believes in a God could allow. I have myself often begged for information concerning the powers and attributes of the God sanctioned by the evolution hypothesis, but so far in vain. The suggestion that the idea of continuousness, or the exercise of power transmitted through matter from the first beginning, or the continuous extension of working and action of such supposed first cause is equivalent to the idea of omnipotence, omnipresence, omniscience, is surely almost an insult to the understanding. Ought not those who care to acknowledge such newly-invented first cause, and those who foolishly try to force on themselves and others the acceptance of the proposition that the views impugned are not atheistic, or only in a very slight degree atheistic, to accurately define the powers and attributes of the God they would substitute for the God in whom men have hitherto believed? If this were done, we should be able to judge whether it was possible for men in their senses to acknowledge such a power, to submit themselves to its guidance, to love, honour, and obey it, to worship it, for the God of man demands all this and more. Judging from much that has been said and written upon this subject during the last few years, it is difficult to come to any other conclusion than that the real aim of many who speak and write in favour of the new views is to destroy, and within a measurable period of time, belief in the existence of the Supreme Being, in Providence, and in a living God, and to force those who think at all to endeavour, by the mightiest mental effort of which they are capable, to train and exercise their minds by the contemplation of an everlasting infinite nothing. Instead of the new doctrines being explained in detail, we are assured by patronisers and promoters of this retrograde nonsense that the reasonings of So-and-so, who has, in fact, done what he could to prove there is no God, "are inspired by a reverence which is truly religious," and so on, until every one capable of thinking must feel weary of such mawkish adulation and misrepresentation of fact. Of course, the real question is whether, in such a system as has been proposed, any power deserving the name of God is required or could possibly find a place, and then what powers the Deity permitted to exist possesses. A God without will, without power to arrange, order, design according as he wills, can hardly be worshipped by man. For, can omnipotence restricted in its operation by inexorable laws be omnipotent? Is not the idea of omnipotence and omniscience, testing by experiment the results of infinite constructive power, worthy of a philosophy hereafter to be distinguished, for physical revelations supposed to be about to be made, and its rejection of the theistic idea?

Much confusion has resulted from the acceptance of fallacies concerning the nature of the changes in living matter, and the dictum, not proved nor at this time provable, that the living and the non-living are one, governed by the same laws and due to the same cause. The chasm between the living and the non-living has not been bridged, and it cannot be bridged by idle assertions to the contrary and speculations about cosmic vapour, however desirous the public may be that the operation of bridging should be accomplished. The form of Materialistic doctrine now popular neither accounts for any single operation peculiar to living matter, nor helps us to understand the nature of any one. Nothing whatever, I fear, has been added by physical science to our knowledge of the real nature of the marvellous change which occurs when a material atom passes from the non-living to the living state, and becomes an integral part of the very simplest or lowest living matter in existence. The nature of this change, which is unquestionably different in its essential nature from any known physical change, has not yet been elucidated, though it has been over and over again declared that it is physical. In spite of all the confident utterances, no one has been able to explain, in terms known to physical science, any one of the phenomena occurring during any moment of the existence of the simplest living form in nature. The pretended physical explanations of growth, of the taking up of non-living matter and its conversion into living matter, the formation of structures, of organs, of parts made for a purpose, are utterly inadequate, while some are puerile, and would be dissipated by five minutes' careful consideration on the part of any one who has the requisite knowledge of the facts, as far as they are now known. Many of the statements about life and living matter will not stand the criticism of an intelligent critic, who, though knowing little or nothing of science, will take the trouble to find out the meaning of the words and the sense in which they are used, in order that he may detect cases in which words are inappropriate, and instances in which the same word is used in very different senses perhaps in the same page, as, for example, occurs in the use of the word "Protoplasm," which does duty for living matter, as well as for matter in the opposite or non-living state. If we could trace the atoms of matter through all their changes, until at last they lived, we should understand the nature of life, we should be able to lay down the laws by which vital phenomena are governed, we should understand the changes in our own bodies, we should know ourselves as well as the matter of which our bodies are composed. But in this case we should have spanned the infinite, solved all problems, explained all the mysteries, overcome the theistic idea, and man would have become a different being, and would find himself in a new position in nature.

But the changes which take place in the atoms as they flit from non-living to living are still unknown, and the probability of our ever knowing their real nature becomes less as knowledge advances. Man, notwithstanding all scientific discovery and material progress, at least, as far as regards his relation to and knowledge of the Infinite, stands much as he did in the early days of intellectual evolution. Here, then, is the immeasurable difference between the view entertained by us and that held by those who accept or incline towards the fashionable philosophy of the period. We who believe in the irreconcilable differences between living and non-living have been led to conclude that a knowledge of the real nature of the change, as well as a knowledge of the power by which the change is wrought whenever a lifeless atom becomes an integral part of living matter, is not to be obtained. On the other hand, the supporters of the new philosophy declare that all this and much more has been gained, and that much of what yet remains imperfectly understood will be brought to light by the advancing science of the future. We hold that such knowledge is not even conceivable in thought—not cognisable by the human intellect. They declare that the discovery of the nature of the vital change is nigh—nay, that in some respects it may be said that already it has been achieved. We do not admit that the road to such a goal has been found out or the method of proceeding which will be successful suggested. They assure the world that wonderful things, not to be seen by ordinary mortals, have been discerned by privileged spirits. We believe neither in the powers of discernment claimed, nor in the being privileged, nor in the spirits. The whole position assumed by those who attempt to explain vital actions by physics and chemistry is untenable, and the pretentious assumption of knowledge as to what is to be revealed by the science of the future degrading to the thought of our time. The non-living state of matter is separated from the living state by a chasm which is unfathomable and which has not been, and which never can be, bridged, even in thought. The attempts which have been made to persuade ignorant people to believe that this has been done, or that it is within the bounds of that which is possible, are unjustifiable and antagonistic to the scientific method, and must certainly retard real progress.

The advocates of Atheism, or of that very nebulous form of Theism which logically leads to it, and is, indeed, practically Atheism, have utterly misled themselves and others by assuming the truth of the conjecture that the non-living and living are one, that matter in the non-living state differs in degree only from matter in the living state. They affirm in the most positive and reckless manner that this conjecture is a fact. Unlearned, unscientific people, believing that men of scientific authority would not have spoken thus positively unless they had distinct and irrefragable proof of the statements they made, proceed straightway to modify all the views which they had been taught in their childhood, abandon as fiction what they believed to be truth, and accept as realities the extravagant and fanciful doctrines of that scientific imagination which change from year to year, and concerning which there is but one thing certain,—that they proceed from and will return to the nebulous state. People hungering for a reputation for comprehensiveness, large-mindedness, and intellectual grasp, abandon their belief in the unseen without even being at the trouble of inquiring whether any evidence or argument can be adduced in favour of the new dicta. The sort of argument which seems to convince people, of course longing to be convinced, is to be found in assertions of the vaguest character about the nebulous originals of suns and planets being connected by a chain of causation with the physical basis of existing life and organisation. Can it be supposed that it is in any sense a valid excuse on the part of any thinking person to urge that the responsibility rests with those who teach these doctrines? The desire for being taught encourages the teachers, and if there was no longing for the doctrines of a silly form of science the supply would soon cease. It is surely as much the duty of intelligent persons to find out and expose erroneous teaching in science as in other departments of human knowledge. If but a very little trouble had been taken by some of those well qualified for the task, a good deal of nonsense which has excited curiosity, pleased the fancy, and deceived the intellect during the last twenty years, would have done no more harm than contribute a little intellectual amusement and help to sharpen the wits of the rising generation. Every person of intelligence ought to be competent to estimate the importance and reliability of reasons given for changing or subverting his belief in the fundamental facts of his religion, and most would certainly, with far less trouble than they take to enable them to decide concerning questions of far less consequence, succeed in doing so. If, for instance, it is said that a living thing grows like a crystal, surely before the dictum is accepted by any one he would naturally inquire whether the new matter taken up by the living thing was deposited particle by particle upon the surface as in the crystal. Doubt would at once be excited in his mind, for no instance would occur to him in which during growth new matter was superposed upon that which was already there, in the case of a living thing. The nourishment always goes into the inside of a living thing, and is never deposited on its outside, as is the case in the crystal when it increases in size. Would it not also occur to him that the matter of the crystal can be dissolved and crystals formed again and again from the solution, while no living thing can be dissolved at all, much less re-crystallised? Such simple considerations would cause doubt to rise in his mind whether a living thing does grow like a crystal, and the doubt would suggest the expediency of further inquiry. He would require, before he accepted the new doctrines, that the particular points in which the so-called crystal-growth resembled and differed from living-growth should be clearly stated. So far from assenting to the proposition that the growth of a crystal was like the growth of a living thing, he would find that the increase in size of a crystal was not growth at all. So, too, with regard to the likeness said to exist between the living and non-living, the particular living and non-living between which this likeness is supposed to exist, should be pointed out. It is probable that the acceptance of many of the most absurd and unreasonable dogmas is due not so much to a want of power to think as to an indisposition to think, and no doubt acquiescence is promoted by a fear of the consequences likely to follow the rejection of, or any opposition to, the said doctrines. He who doubts or opposes is to be numbered with the fools. Nevertheless, I beg of you to consider what you would think of a person who assured you that a watch differed from the iron and brass of which it is made only in degree, and I leave it to you to determine what you ought to think of a philosopher who tries to make you believe that a living thing differs from the non-living matter of which its body consists in degree only. If at this time you press for reasons in favour of the conjectural unity of the living and non-living, all you will get will be some dictum about primitive nebulosity and chains of causation. Anything like criticism is so disliked by the new Materialist, that he condemns those who differ from him by anticipation, and thus for a time criticism is deferred, and his conjectures and fancies may find favour ; but that people should be led away so far as to renounce their belief in any form of religion, to deny God, and to abandon their hope of a future state, is marvellous indeed.

In conclusion, let me commend to you the words of Kant. "Criticism," said he, "alone can strike a blow at the root of Materialism, Fatalism, Atheism, Freethinking, Fanaticism, and Superstition, which are universally injurious."

THE LIVING AND THE NON-LIVING.

The following remarks upon this subject were made by Professor **Lionel S. Beale**, F.R.S., during the discussion on Dr. Wallich's paper* "On the Fallacy of the Materialistic Origin of Life," read before the Institute, April 17th, 1882.

I propose to offer a few remarks on the view taken by Professor Huxley and other scientific men, both here and on the Continent, in reference to the very important question of the transition from the non-living to the living. I am quite sure we shall agree that this is really the kernel of this most interesting subject. We are constantly told of the gradual passage from the non-living to the living, and the formation of a living thing is often spoken of as if the process were something like the change which takes place in the formation of crystals. Most authorities who support the materialistic hypothesis draw a parallel between the formation of the lowest forms of living matter and crystals. Now, it must occur to every one who has at all considered the subject of crystallisation, that although there may be great difficulty in explaining the exact nature of the process, yet, nevertheless, it is well known that when a certain material is dissolved in fluid under certain circumstances, and the solution becomes concentrated, crystals are formed. Every tyro in chemistry has, probably, performed the experiment with common salt; and every such tyro, after having crystallised common salt, has re-dissolved it, and re-crystallised it again and again; and, if he were to go on crystallising and dissolving to the end of time, he would only produce crystals of the same form and the same chemical composition. Now, let him try to do this with regard to a living organism. The living organism is there. We know that every particle of living matter has come from a pre-existing living particle; but let us endeavour to take ourselves back to the time when there existed only the non-living, the inorganic matter out of which the living had to be formed according to a method as is affirmed somewhat resembling that of crystallisation. The chemical compounds that form the living matter—oxygen, hydrogen, nitrogen, and carbon—are supposed to come together in obedience to certain attractions and affinities which these primitive particles possess, but of which we know very little; but let us suppose a living thing is formed. Let us imagine the particles brought together in the manner supposed, and that a particle of living matter makes its appearance. We examine this particle, and try to ascertain its nature, and for this purpose we try, as we have tried in the case of the crystal, to dissolve it. What is the result? We destroy it; we do not dissolve it. (Hear, hear.) It ceases to be living matter before solution begins. It is no longer what it was before, and we cannot make it so. It has gone; it has ceased to be what it was, and we are not dealing with a living particle, but simply with the material that has resulted from the death of that which was before alive. We cannot re-form it. Once dead, it is incapable of being re-produced. Therefore, it seems to me a most extraordinary thing that some of the greatest authorities in science should pretend to compare the formation of living matter with the formation of crystals. There is not the slightest analogy, nor the faintest possible parallel, no comparison between living things and crystals. There is all the difference in the world between the process of crystallisation and the formation of living particles, which are supposed by Haeckel, and others who adopt his views, to be alike. Whatever may be the marvellous changes that occurred in the first formation of living matter, they cannot resemble in the slightest degree any phenomena with which we are familiar. There are no properties of matter that have as yet been discovered that can give us the faintest conception of the nature of the changes which must have taken place when the first living thing was formed. With regard to the question of complexity and simplicity, of which a good deal has been said, I will just offer a few remarks, and will then sit down. It seems to me to have been assumed in a most extraordinary way that some forms of living matter are extremely simple and that others are extremely complex. I should like to ask what is the meaning attached to these terms "simplicity" and "complexity," when applied to living matter? Let us take the monera, said to be among the simplest forms of living matter with which we are acquainted. All we can see is clear, colourless, transparent, structureless, semifluid matter. Where is the evidence that the composition of this is more simple than that of the most complex living matter in existence? Take, for example, the highest form of living matter we know—the living matter which forms part of the brain cells of man himself, for I suppose we cannot conceive anything much higher. If we were to assume gradations of complexity and different degrees of superiority, we might go as far as to suggest that at any rate the highest and most complex living matter is to be found in the grey matter constituting the outer part of the human brain. But what is the fact? The matter we find there is no more complex than the living matter of the simplest monad, as far, at least, as we know. If we take this brain matter and examine it, we find that we can resolve it into certain organic substances, closely allied to the albuminous material which Professor Huxley and others call protoplasm, although they are not able to define precisely what they mean by the term. (Hear, hear.) They are unable to tell us in what way protoplasm differs from albumen, and. muscle tissue, and a thousand other things. They simply make use of a name almost without a meaning. Well, the highest conceivable form of living matter, as far as we know, closely accords in its composition with the lowest form of living matter; and, as far as regards structure, if we examine that which comes from the highest organism, and that which is concerned in the formation of the lowest, no difference whatever can be distinguished. It is not that one is more complicated, or exhibits a structure different from the other. There is no structure in either. Both are perfectly clear, transparent, and structureless, and yet one is concerned in the performance of certain functions and offices, while the other is concerned in the performance of totally different functions and offices. Are we, then, to believe that the difference in the functions discharged is due merely to the chemical properties of the substances of which the living matter is composed? We cannot do this, because, when we come to analyse the two different kinds of living matter, we find in the material which results from their death the same elements. And, if the elements are not in precisely the same amounts or in the same proportions to one another, the difference which may exist in the composition bears no relation and has no reference that can be discovered, either to the difference in action or to the different structures which may be evolved from the two different forms of living matter. Therefore the terms "simplicity" and "complexity" seem to me to be totally inadmissible, and I venture to think that not one of those who are in the habit of speaking of simple and complex forms can give a rational explanation of what he means by the phrases he employs. What is generally meant by the simplest form of living matter is that when it attains its highest form of development it is still a simple thing, and what seems to be understood by that of the greatest complexity is, that when it attains its highest degree of development certain marvellous structures are produced; but when we come to look at the living matter itself there is no difference to be discerned by any means of examination yet adopted between the two forms. The living matter, which, at the very earliest period of his development, represents man, is, as far as I know, not distinguishable from the forms of living matter of which the simple bodies Dr. Wallich has so lucidly described to us are made up. And therefore the difference cannot be chemical. Neither can it be called physical, nor mechanical, nor can it be due to difference in machinery or mechanism, for none is to be discovered. The difference is enormous, and it is of a most remarkable kind, but it is not to be explained by any facts in physical science with which we are acquainted. All we know is, that under certain conditions one form of living matter *grows* and produces a certain kind of structure, and that under different conditions certain other forms of living matter *grow* and produce a structure that is totally different. The difference between the two is not in molecular or chemical constitution. They do not remarkably differ in chemical composition, and we may safely say it is impossible thus to explain the difference. That is the whole of the matter ; the difference in the results cannot be explained by physics or chemistry, and I do not think it ever will be so explained. The difference is one which can only be spoken of under another term altogether, and this is a word to which many object very strongly. I allude to the word "vital." The difference in question is a vital difference, dependent not on a property which belongs to matter itself as matter, or derived from any properties in connexion with the elements which enter into the composition of the living matter. Whether the generation of living matter was spontaneous or not cannot be proved, but much scientific speculation is built upon the theory of spontaneous generation. However necessary such a theory may be to the doctrine of evolution, there are no scientific facts which can at all warrant the conclusion that non-living matter only, under any conceivable circumstances, can be converted into living matter, or at any previous time has, by any combination, or under any conditions that may have existed, given rise to the formation of anything which possesses, or has possessed, life. (Applause.)

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* As yet, ill-health has prevented this author completing his paper for publication ; but it is hoped that it may form part of No. 64 of the *Journal*. —Ed.

ORDINARY MEETING, Feb. 20, 1882.

J. E. Howard, Esq., F.R.S., V.P., in the Chair.

The minutes of the last meeting were read and confirmed, and the following elections were announced :—

Associates :—The Lord James Douglas, Glen Stuart ; Rev. T. N. Farthing, M.A. Cantab., Mossley ; C. J. W. Pfoundes, Esq., F.R.G.S., F.R.A.S., F.R.S.L., F.R.H.S., &c., London ; Miss A. F. Layard, Bath.

Hon. Local Correspondent :—Rev. C. H. H. Wright, D.D., LL.D., Ph.D. (Leipsic), Belfast.

Also the presentation of the following works for the library :—

"Proceedings of the Royal Society."	*From the same.*
"Proceedings of the Geological Society."	*Ditto.*
"Proceedings of the Antiquarian Society of Philadelphia."	*Ditto.*
A Smaller Work. By H. Phillipps, Esq.	

The following paper was then read by the author :—

THE THEORY OF EVOLUTION AS TAUGHT BY HAECKEL, AND HELD BY HIS FOLLOWERS, EXAMINED, AND SHOWN TO BE NOT PROVEN.

By Joseph Hassell, Associate of King's College, London.

"SO God created man in His own image, in the image of God created He them ; male and female created He them." A noble origin this ! An origin which indicates both a divine ancestry and a glorious destiny. Such an origin

Note.—The writer wishes it to be distinctly understood that he does not class all Evolutionists with Dr. Haeckel. He recognises the fact that there are three classes of evolutionists. There are first, those who receive the hypothesis to account for the existence of all species of animals in the present day, but who do not admit that it accounts for the beginning of life ; secondly, there are those who, while they accept the hypothesis as being conclusive with regard to all the lower orders of animals are not content with it when it is applied to man's origin ; and thirdly, there are those, and I am afraid they are increasing in number, who follow directly and openly the teachings of men, who, like Dr. Haeckel, of Germany, are, in reality, atheists.

The object of the paper is to examine the hypothesis as stated by Dr. Haeckel, who may safely be regarded as the exponent of the most advanced non-theistic evolutionist theories of the present day.

and such a destiny has been the faith and hope of millions of the human family in all ages, and the teaching of not a few of the profoundest scholars of their day.

Now, however, we are called upon to give up this faith in man's noble descent, and accept—at the risk of being considered unscientific—the dictum of the German professor, Ernst Haeckel, and believe that man has been evolved out of the monera, to hold that "There is no doubt that man is descended from an extinct mammalian form, which, if we could see it, we should certainly class with the apes"; and "It is equally certain that this primitive ape in turn descended from an unknown semi-ape, and the latter from an extinct pouched animal."* And this, again, from another unlike creature, and so on by successive steps backward until the first shapeless, structureless mass of protoplasm is reached which was, we are told, the true ancestor of man.

Now, since the views of the German professor on the subject of evolution are held by many scientists of our own country in the present day, and are used by some to disprove the Bible account of man's origin, it will be well to examine the subject carefully, and test the hypothesis both by common sense and by the teaching of modern science.

In the first place, it will be necessary to examine the foundation on which the hypothesis rests. Man, says the professor, has descended from the monera. Well! But from whence the monera? Now note the answer:—"When animated bodies first appeared on our planet, previously without life, there must, in the first place, have been formed, by a process purely mechanical, from purely inorganic carbon combinations, that very complex nitrogenised carbon compound which we call plasson, or 'primitive slime,' and which is the oldest material substance in which vital activities are embodied. In the lowest depths of the sea such homogeneous amorphous protoplasm probably still lives in its simplest character, under the name of bathybius. Each individual living particle of this structureless mass is called a monern. The oldest monera originated in the sea by spontaneous generation, just as crystals form in the matrix." †

After declaring that the doctrine of spontaneous generation cannot be experimentally refuted, and admitting that it cannot be experimentally proved, the professor goes on to say,‡ "He, however, who does not assume a spontaneous generation of monera to explain the first origin of life upon our earth, has no other resource but to believe in a supernatural miracle; and this, in fact, is the questionable standpoint still taken by many so-called 'exact naturalists,' who thus renounce their own reason."

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* *The Evolution of Man*, vol. ii., p. 26. † *Ibid.*, p. 31.
‡ *Ibid.*, p. 32.

In keeping with this is the opinion of Professor Strauss, who, in his work, *The Old Faith and the New*, gives it as his opinion that bathybius was a presumable triumphant keystone in his argument against belief in the supernatural, and this was just what he wanted. For he had once confessed that a miracle must have occurred at the introduction of life, unless some method of filling up the chasm between the dead and the living forms of matter could be found. Bathybius is, in the opinion of the Professor, that other method; it does, in fact, span the chasm between the living and the not living, so the belief in miracle was rendered impossible.

But does bathybius really span the chasm? Let us see. Dr. Lionel Beale in his work on protoplasm quotes Dr. Wallich, who says, "Bathybius, instead of being a widely extending sheet of living protoplasm, which grows at the expense of inorganic elements, is rather to be regarded as a complex mass of slime with many foreign bodies, and the *débris* of living organisms which have passed away. Numerous living forms are, however, found upon it."* Nor is this all. In the October number of the *American Journal of Science*, 1876, in an article on the voyage of H.M. Ship Challenger, it is affirmed that some bathybius had been dredged from the bottom of the sea and submitted to chemical analysis. It was found to be made up of sulphate of lime, and when dissolved it crystallised as gypsum. Here, then, the boasted bridge which was to span the chasm falls to pieces. And yet it is upon this uncertain, this unsound basis, that the conclusions of the German professor rest, at least, as far as concerns the introduction of life on our planet.

But it may be asked, Have not experiments been performed which prove that living bodies have been produced from the non-living? How about the experiments of Dr. Bastian? Let us examine the subject carefully.

In the year 1870 Dr. Bastian published his account of the experiments which he performed. It appears that he prepared certain infusions of hay, turnips, &c., and placed them in glass tubes. He then submitted them to the action of heat, and while the steam was issuing from the ends of the tubes he sealed them so as to exclude the air. After a time the infusions were examined under a powerful microscope, and in some were found various forms of animal life. How came they there? The Doctor concluded that by the action of heat all the germs of life which might have been in the water were destroyed, and therefore, as life was now present, it must have been produced *de novo*, or in other words, there must have been spontaneous generation. Shortly after Dr. Bastian published the account of these experiments, Professor Huxley, in his address to the British Association, questions the conclusions of the Doctor, and while claiming for himself "a philosophic faith" in the probability of spontaneous generation in the far-off past, still says that "Biogenesis—that is, life through the action of life—appears to me, with the limitation I have expressed, to be victorious along the whole line at the present day." Again. In the year 1879 Dr. Tyndall performed a number of experiments with a view of further testing the question. He procured sixty flasks, in which he placed infusions of beef, mutton, turnips, and cucumber. All these infusions were boiled for a certain length of time, and while boiling the necks of the flasks were sealed. The Doctor now carefully packed up and removed them to his house at Bel-Alp in Switzerland, at an elevation of 7,000 feet above the sea. When the box was opened fifty-four of the infusions were found to be clear, and six muddy. On close examination it was discovered that the flasks containing the muddy infusions were damaged, and, as a consequence, the air had entered. In these various forms of life were found to exist.

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* *Protoplasm*, by Dr. L. Beale, p. 110.

The fifty-four remaining flasks were now exposed for three weeks to the sun's rays by day, and to the warmth of a room by night; at the end of the time they were as clear as at the commencement. Four of the flasks were now damaged, and the fifty remaining were divided into two sets. Twenty-seven were carried up to a ledge of the Alps 10,000 feet above the sea. The ends of the flasks were now broken, and the whole were allowed to remain for a period of three weeks exposed to wind which was blowing across the snow-capped peaks of the Oberland. At the end of three weeks the infusions were found as clear as they were before the exposure, and when submitted to microscopic investigation there were no traces of animal life.

The other twenty-three flasks were taken to a hay-loft in the rear of the Doctor's house; the necks were broken off, and the infusions allowed to remain for three weeks in direct communication with the air. At the end of the time the infusions were found to be muddy, and when submitted to microscopic investigation were found to be rich in animal life.

When the Doctor returned to London he performed a number of experiments under similar conditions, and in every case with similar results.

When speaking of these experiments, and supposing they had been investigated by a careful observer, he says, " Such faithful scrutiny fully carried out would infallibly lead him to the conclusion that, as in all other cases, so in this, the evidence in favour of spontaneous generation crumbles in the grasp of the competent inquirer."—*Fragments of Science*, vol. ii., p. 319. 1879.

So much, then, for the hypothesis and the experiment. We go a step further, and assert that it is contrary to the analogy of nature to suppose that spontaneous generation did ever take place. Let us test the question by geology. It is generally admitted that the formation of the various strata of rocks which form the earth's crust was due to precisely the same physical forces that now exist. If spontaneous generation did once take place, it must have been at a time when the physical forces of nature were at work which resulted in the formation of our rocks and earths. Now, as the same forces are in operation at the present day as were in past ages, what they were able to accomplish then they are able to accomplish now. If mere physical forces were able to produce life twenty thousand or twenty millions of years ago, they are equally able to produce life at the present time. But there is, as we have shown, no well-authenticated instance of spontaneous generation at the present time, although the physical forces of nature remain the same as at the period when it is assumed they did produce life. We must, therefore, insist that if spontaneous generation does not occur at the present day we have a right to assume that it never did.

Now, as all the conclusions of Professor Haeckel are drawn from the assumption that at some time in the unknown past life was introduced on our globe by spontaneous generation, which has never been established as occurring, and which, on the parity of reason, we have a right to conclude never did occur, we hold that the doctrine of evolution is unscientific, being grounded on a mere hypothesis unsupported by proof. Science is truth—truth ascertained by observation. But the origin of life by spontaneous generation, and the origin of species—species we say, not varieties—are not ascertained facts, but are mere assumptions. The conclusions which are drawn from these assumptions are the fruit of mere scientific imagination, and we are bold enough to say that imagination has no authority in such a question as this. As life is everywhere seen to be the product of life—of the living, not of the not living—it is reasonable to believe that this wonderful and mysterious power was introduced by the Great First Cause, who "is the Lord and giver of life." To believe this is much more reasonable than to believe that life originated by mere mechanical action. Surely, then, the German professor is unscientific, inasmuch as he draws his conclusions from mere hypothesis, not facts; and persuades himself, and expects others to be persuaded, that these fallacious conclusions are facts. He attributes effects to insufficient causes. On the other hand, those who believe in the creation of certain typical forms—true species—of living creatures by a Great First Cause, attribute the marvellous effects by which they are surrounded to a cause commensurate with these effects: life from life; laws from a law-giver; adaptation of means to ends, as the deliberate planning of one who saw the end from the beginning, and not the result of blind unreasoning "Natural Selection," whatever that may mean.

Let us go a step further and calmly inquire what the doctrine of evolution as taught by Professor Haeckel requires us to believe. Nothing less than this. First, that all inorganic bodies at present found on our globe and all parts of the solar and stellar systems, have been developed out of a simple homogeneous mass of matter; and, second, that all the forces of nature, both mechanical and chemical, and even psychical, are not the result of mind and will, but are the product of molecular motion, which motion—in the absence of mind—must have been assumed by the particles of matter themselves. But this is opposed to human reason. Because,—

1. It is admitted that matter is inert—that is, it cannot of itself originate motion. Now, if this be so, and we see it is, then every exhibition of motion at the first must have originated in something outside matter, *i.e.*, in mind.

2. But it is indisputable that matter does exhibit motion and other forces, and is governed by laws which are discoverable, and when discovered are found to be uniform. As these laws could not have originated in matter itself, they must have been impressed on it by mind.

3. Now, since the forces, the laws and the motions of matter were in operation long before any human mind existed, it is evident that there must have been a sentient Being existing at the time when matter first exhibited these various forces, and that this Being impressed these forces on matter. This Being, the great First Cause, we call God.

We are bold enough to say that the above propositions are in accordance with the deliberate judgment of mankind at all times, and are strictly scientific.

To this deliberate judgment of the human race Dr. Haeckel opposes himself, and asserts that matter did originate for itself forces; that matter did make for itself those laws by which it is now governed; so that out of impotency came power, and out of disorder came order. Such a belief is, we hold, both unreasonable and unscientific. Is not such a creed a "blind belief"? How much more reasonable and more worthy of acceptance is the doctrine of the direct creation of forces and the arrangement of laws by an Almighty Being, the great First Cause of life, of order, and of beauty.

Now, concerning the evolution of the solar system out of the "Nebulous Fire-dust" without the action of a mighty will, it may safely be affirmed that there are many circumstances connected with it for which the hypothesis fails to account. Thus, to quote the words of Mr. R. A. Proctor, in his *Expanse of the Heavens*, published in 1873, "It does not account for the strange disposition of the masses of the solar system. Why should the inner family consist of minor bodies in the main unattended, while the outer consists of giant orbs with extensive families of satellites? Why should the innermost members of the outer family of planets be the largest, while just within these lies a family of asteroids, not only individually minute, but collectively less than Mars, or even Mercury? Why should the two middle planets of the inner family be the largest members of that family? Laplace's theory gives no account of these peculiarities; nor perhaps could it be insisted that these peculiarities should be explained; yet if any other theory should give an account of these features, explaining also the features which we have seen accounted for, then such theory would have a decided advantage." Now, we think the theory that the disposition of the heavenly bodies by an almighty Being a more reasonable one. Again: Evolution does not account for those wonderful laws which govern the motions of the members of the solar system, especially that of their relative distances, which it was the glory of Kepler to have discovered, and which he found to be as follows:—The square of one planet's period of revolution round the sun is to the square of the next planet's revolution, as the cube of the former planet's distance from the sun is to the cube of the next planet's distance from the sun. Here, then, is a wonderful fact, and one which we challenge the learned professor to account for by evolution, pure and simple.

In the next place we have to remark that the doctrine of

Haeckel respecting evolution requires us to believe that all the past and all the present forms of animal life have been evolved out of a structureless minute mass of mucous albuminous matter—minute protoplasms, or bioplasms as they are called, and that out of these formless masses, by differentiation and natural selection, man himself has been produced. Do we ask the professor to give the steps by which the wonderful changes have been effected, he is, we admit, ready with his answer?

The gradual development of man from bathybius is thus stated by Haeckel in his *History of Creation*, and implied in his *Evolution of Man*.

Step 1. Minute portions of structureless protoplasms—the monera of to-day—"Organisms without Organs." In the course of time, by differentiation an inner kernel was developed, and thus there was produced—

Step 2. Single-celled creatures, like the amœba of the present day. In the process of time these primordial creatures became sponges.

Step 3. These associated amœba gave birth to ciliated larva, which, by natural selection, produced a new race of beings, viz.:

Step 4. Simple-stomached animals—primitive worms which, after untold ages, gave rise to—

Step 5. Gliding worms, which, not being content we must suppose with their lowly estate, determined to improve their condition, and so gave birth to—

Step 6. Soft worms—the scolecida. These creatures, by some unaccountable means, formed for themselves a true body cavity, and managed somehow or other—the professor does not say how—to possess blood. In the course of ages these soft worms gave rise to—

Step 7. Sack-worms, which originated out of the former creatures by the formation of a dorsal nerve, and by the formation of a spinal rod, which lies between it. After many ages these creatures produced—

Step 8. Skulless animals like the present lancelet. These wise animals managed to produce a progeny in which the sexes were separate. In the course of time these creatures gave birth to quite a different race altogether, and thus were formed—

Step 9. Single-nostrilled animals, which were developed out of the former by the anterior end of the dorsal marrow forming itself into a brain, and the chord into a skull. In the course of ages these creatures evolved themselves into—

Step 10. Primæval fish. In these animals the nostril divided itself; a double nervous system was evolved; jaws were formed; a swim-bladder made its appearance; and two pairs of legs were developed; and so was produced—

Step 11. The mud-fish, somewhat like the present salamander, and this was effected by the adaptation of life on land. The swim-bladder was now made into an air-breathing lung, and thus was produced—

Step 12. Gilled amphibiums, such as are met with in the present day. In the course of ages these creatures were evolved into—

Step 13. Tailed amphibians. These creatures accustomed themselves to breathe only by means of gills in the early stages of their life, and in the latter stages through lungs. In the course of ages these gave birth to—

Step 14. The primæval amniota. These were evolved out of *an unknown tailed amphibian*, by the loss of gills. Strange to say, the organs of tears were now developed. How wonderful! After many ages these creatures were evolved into animals with hairs and mammary glands, and so—

Step 15. Primary mammals, closely related to the ornithorhynchus of the present day, were produced. By degrees these monotremata produced—

Step 16. Pouched animals. In the course of time one of these marsupial creatures produced—

Step 17. Semi-apes, which, in the lapse of ages, produced the animals of the narrow-nosed monkey tribe, and out of these were evolved—

Step 18. The tailed apes of the New World, which, in the course of ages, produced—

Step 19. The man-like apes (anthropoides) which, in the process of time, lost their tails and a portion of the hairy covering on the back. Poor things! How much inconvenience they must have suffered on this account! When speaking of these creatures the professor says,—"*There do not exist direct human ancestors among the anthropoides of the present day, but they certainly existed among the unknown extinct human apes of the Miocene period.*" We beg the reader to mark this assumption,—"*they certainly existed*"—that is, they existed in the professor's imagination. In the face of this assumption, however, Professor Haeckel continues his steps in the development of man as if it were a thing of certainty, and states that in the process of time these man-like apes produced—

Step 20. Ape-like men. In the course of time out of these were evolved—

Step 21. Man, who was developed out of the former race by the gradual development of the brain and the larynx, so that language and mental power were the result. All these changes were produced by natural selection, resulting in "the survival of the fittest."

Such is the creed of the learned professor, and such must be, he says, the creed of every man who claims to be scientific. "We must," writes the professor, "either accustom ourselves to the idea that all the various species of animals and plants, man also included, originated independently of each other by the supernatural process of a divine creation—or we are compelled to accept the theory of descent in its entirety, and trace the human race, equally with the various animal and plant species, from an entirely simple primæval parent form. Between these two assumptions there is no third course; either a blind belief in creation, or a scientific theory of evolution." *

But to proceed. Let us now inquire into the grounds for believing that man has been evolved out of the monera. Here is the answer. Because, in all living creatures there is a similarity of organization, and a graduation which has a general relation to the historic succession of life.

We admit that there are many points in which the structure of one set of animals resembles another set in the same sub-kingdom. Thus, all the protozoa are built up on the same general type; all the cœlenterata on another; all the annuloida on another; all the annulosa on another; and so on, through the whole animal kingdom. But while the animals in each sub-kingdom are marked by a similarity of structure, those of another sub-kingdom are marked by differences equally as striking. Every student of zoology knows that, while in the sub-kingdom annulosa the main masses of the nervous matter lie on the ventral side of the body, in the sub-kingdom vertebrata they lie on the dorsal side. Other points of structure might be noticed equally as marked; indeed, we may say that each sub-kingdom is characterised by a well-defined structure of its own. And what is still more remarkable, the blood corpuscles of the different classes of the vertebrata have a character of their own, both as regards size and form. In fishes, reptiles, and birds, they are oval, while in mammals they are, with one exception, round. At the same time, they are smaller than those in the three other classes.

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* *The Evolution of Man*, vol. ii. p. 36.

Then, as to the historical succession of life, we shall show, by-and-by, that the testimony of the rocks fails to supply the necessary links. But, admitting that there is a similarity of structure in any or all of the sub-kingdoms of the animal world, does similarity prove identity or commonality of origin? Certainly, says Professor Haeckel. If not, how is it that man in some period of his embryonic condition resembles the lower animals? Hear what Professor Agassiz said on this point in the year 1873. "Embryonic conditions of the higher vertebrates to-day recall adult forms of lower vertebrates in the earlier geological times. From this fact the evolutionist *infers* that there has been some natural development in the long sequence of ages of the one out of the other. But the embryonic conditions of the higher vertebrates recall adult forms of lower vertebrates now living, their own contemporaries, just as much and in the same way as they recall the fossil forms. Shall we infer that because a chicken or a dog, in our own day, in a certain phase of its development resembles in certain aspects a full-grown skate, that therefore chickens and dogs now-a-days grow out of fishes? We know that it is not so, and yet the evidence is exactly the same as that which the evolutionists use so plausibly to support their theory. The truth is, that while a partial presentation of the facts seems to sustain this theory, when taken in their true connexion and fairly stated they destroy it by proving too much. They show that the relations between fossil animals supposed to prove descent, exist also between living animals where they have nothing to do with descent."

When speaking of this subject, the Rev. Alexander Stewart, M.D., of Aberdeen, well says: "To argue, however, that because there is physical similarity there must also be identity of being, is to proceed on the basis of a manifest fallacy. We might as well conclude that because the bodies of two men are the same in kind their moral character must also be identical. Have we not what is known in chemistry as isomorphous bodies—bodies which are alike in form and similar in chemical constitution, yet different in their properties? The salts formed by these substances, with the same acid and similar proportions of the water of crystallization, are identical in their form, and, when of the same colour, cannot be distinguished with the eye; magnesia and zinc sulphate may be thus confounded . . . In these isomorphous substances the identity of shape is so complete that they all possess the same crystalline form (octahedron, eight sides). No scientist, however, will presume to say that they are identical in kind or in qualities; or that the one has been evolved from the other. Why then should we be expected to believe that because physical resemblances exist more or less between man and the higher apes, he and they should therefore be one save only in the degree of development."

Again: The mass of protoplasm, we are told, which ultimately produces a fish, is of the same nature as that which ultimately produces a reptile, a bird, or a mammal. Admitted, at least as far as the chemical analysis of dead protoplasm goes, but not admitted as regards the potentiality of each. For though the life-germ of each class is the same at first, it does not continue the same throughout its development. When the egg quickens there is a different segmentation for each of the great sub-kingdoms. All the eggs of the vertebrates may begin their development in one way and run on in the same way for a while; but the invertebrata begins in another, and in virtue of their own special potentiality they divide, and sub-divide, and weave in one case a protozoon, in another an insect, in another a mollusk, in another a fish, in another a bird, and in another a mammal, as the case may be: and this they always do, and, as far as evidence goes, always have done. Professor Haeckel, who bases his conclusion of man's descent from the amœba, on the similarity of the egg-cell of all animals, by a diagrammic representation of the egg cleavage of seven distinct classes really shows that the differentiation is different in each. Thus, while the parent cell of man, frog, and the amphioxus, presents no appreciable difference, the first cleavage state is not at all the same. In man the cleavage is dual, while in the frog and amphioxus it is quadruple; and, indeed, the whole of the five separate developments of the cells are dissimilar.* In fact, the diagram might with advantage be as well used by the opponents of the theory to substantiate their views as by the evolutionists to prove theirs. To adopt the language of Dr. Cook, of Boston, we may say: "Just as the weaver, when he throws his first shuttle, has the plan of the whole fabric in his mind, because he has arranged beforehand the pattern, and has provided for it in the disposition of his warp, so there is a well-arranged plan settled before to which each bioplast works; and, in virtue of this prearranged plan, all creatures produce progeny after its kind. To each seed is given its own body."

Once more. Is it not a fact, asks the evolutionist, that in the progeny of some kinds of animals there are often well-defined varieties? Granted. But are *varieties* the same as species? Certainly not. There are, we admit, very many varieties of dogs, and of cats, of pigeons, and of fowls. But the dog tribe is distinguished from the cat tribe by well-defined marks, as is also the family of the pigeons from the family of the fowls. And what is more, each in the fulfilment of the great purpose of its life always seeks the companionship of one of its own kind, and in the process of time another of its kind is produced by, and of, its own kind, which thing, as far as evidence can be furnished, has always been the case. The mummy cats and ibisses of Egypt are identical with the cats and ibisses of to-day. If, then, the sum of the changes of four thousand years is nil, what right has Dr. Haeckel to assume that the sum of the changes of forty thousand years is the development of an ape out of a monera?

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* *The Evolution of Man*, vol. i., p. 240.

Many eminent scientists of the present day, while not agreeing, it may be, with Professor Haeckel as to the exact lines on which the gradual development of the higher vertebrates from the lower vertebrates has run; nor yet as to the production of life at the first, yet regard the doctrine of evolution as proven; and hence these leaders of scientific thought, both in their addresses and in their writings, take the thing for granted. The result of this is, that not to agree with them in this particular is to lay yourself open to the charge of being unscientific. But to this we demur. To be scientific is not merely to acquiesce in opinions, but to possess knowledge—truth ascertained and systematized.

Respecting the general question of the origin of species by natural selection, let us suppose the point in dispute reversed. Suppose, then, that we were everywhere surrounded with proofs of the transmutation of species, and the opponents of evolution to assume that though species did not at the present time breed true, yet in the far distant past they did, but that somehow or other all was altered now,—what would the evolutionists say? Would they not argue thus? We see around us the evidence of change; the known present is one of transmutation of species. Proceeding, then, from the known present to the unknown past, we conclude that what is true in the present was true in the past, and therefore you are wrong in assuming that true species were produced at the first by the direct agency of the Great First Cause.

In this they would, we think, be right.

Now look at the case as it stands. We are everywhere surrounded with the evidence of the non-transmutation of species. This is the known present, and, proceeding from this known present to the unknown past, we conclude that what is true in the present in this particular was true in the past; and hence we say to the evolutionist, you are not justified in assuming that at some period in the unknown past all was different from the present. Now the animals of a particular species breed true; then they did not: now species are persistent; then they were not. Surely such an argument as this is illogical.

Such being the case, we hold that it is both reasonable and scientific to believe that at some time in the far distant past, a certain number of distinct species or types,—if one may so speak,—were created by the Great First Cause, and that when they were called into existence each was endowed with the power of producing progeny after its kind, and that to "each seed was given its own body." Such a faith commends itself to human reason, because it attributes a great effect to its commensurate cause.

Evolution, as taught by Professor Haeckel, on the other hand, does not commend itself to reason, because it attributes great effects to insufficient causes.

Evolution and natural selection require us to believe two most extraordinary things.

First.—That there was "selection" by the lowest form of animal life to a higher, when there was nothing higher than itself from which to select. For if life commenced with the monera, which were structureless—life without organs—and nothing higher, whence the struggle for existence, which, according to the advocates of the theory, led to the improvement of the race?

Second.—That the lowly-formed mass of jelly was impelled in some way to alter its form and improve its condition when there was really no necessity to do so. For the monera were as adapted to their mode of life as the amœba, the hydra, or any of their immediate descendants.

As we asked at a previous stage of our investigations, Whence came life at the first? so we ask now, Whence came the power, the desire, the will—call it what you please—that led some of the monera to assume a more complex structure? and why all did not do so, when all were subjected to the same influences, and placed in the same circumstances? For if "natural selection does nothing without variability, and this depends in some manner on the action of surrounding circumstances on the organisms," then there could have been no room for its action when there were no organisms to be improved by the surrounding circumstances.

Let us now examine Haeckel's doctrine in order to see whether it will account for the incipient stages of certain special structures.

It is a fundamental article in the creed of every evolutionist that, in the origin of species, all changes have been individually slight, minute, and insensible. Hence, Mr. Darwin says, "Slight individual differences, however, suffice for the work, and are probably the sole differences which are effective in the production of new species." . . . "Natural selection, if it be a true principle, will banish the belief of any great and sudden modification of their structures." . . . "Natural selection acts only by taking advantage of slight successive variations; she can never take a sudden leap; but must advance by short and sure, though slow steps." . . . "If it could be demonstrated that any complex organ existed, which could not possibly have been formed by numerous successive slight modifications, my theory would absolutely break down."—*Origin of Species*, p. 239.

Let these articles of the evolutionist's creed be tested by some special peculiarities of animal structure. Take, for instance, the case of the baleen in the mouth of the Northern, or "Right Whale"—which subsists entirely on animal food—small medusa and other minute creatures. When the whale feeds it takes into its mouth a large quantity of water, in which the food is swimming. It cannot swallow all the water, so this is got rid of through the strainers formed by the plates of baleen, which are arranged side by side along the whole length of the upper jaws. The fringy nature of the inner edge of the plates secure the prey.

Now, according to Professor Haeckel, the progenitors of the "Right" Whale were not whales at all, but some other species of mammals. What other aquatic mammals are there through which the changes may have been effected? The only other purely aquatic mammals are the dugongs and the manatees. But these are purely vegetable feeders, and cannot, therefore, be held as being the immediate progenitors of the whale. And even if they were, until the baleen was sufficiently developed to serve as a perfect strainer, it would have been detrimental to the animal, and ought, on the hypothesis of "Natural Selection," to have been degraded, and ultimately to have been obliterated, or, at least, to have become rudimentary. Let us suppose the case of a dugong, or some such creature, in the process of development into a "Right Whale." At one period in its history it would have had half-formed baleen in the upper jaw, and half-degraded teeth in the lower jaw. How would such a creature subsist? It would be unfitted for procuring its vegetable diet, and unable to retain within its mouth the medusæ which might enter that organ. Surely the fate of such a creature would be gradual starvation. How is it then, we ask, that we have any whales at all at the present day? How! In this way answers a living naturalist:*—"In North America the black bear was seen by Hearne swimming for hours with widely open mouth, thus catching, almost like a whale, insects in the water." We do not question this fact: but we do question the conclusion drawn from the fact. The philosopher goes on to say, "Even in so extreme a case as this, if the supply of insects were constant, and if better-adapted competitors did not exist in the country, I see no difficulty in a race of bears being rendered by natural selection more and more aquatic in their structure and habits, with larger and larger mouths, till a creature was produced as monstrous as a whale." This is one of the *monstrous things* which, on the hypothesis of evolution, we are asked to believe! But we prefer, however, to let reason control our imagination, and accept its verdict that such a faith as this is inconsistent with common sense. There is another fact in connexion with the structure of the whale which should receive special attention. The whale, as an aquatic air-breathing mammal, cannot exist without a constant oxygenating of its blood. And yet the creature can remain submerged for an hour, and not suffer any inconvenience. And this it can do by reason of a special provision which has been made to supply the system with a constant flow of arterial blood during the period of its submergence. And this is how it is effected. While the heart of a whale is not larger in proportion to the size of the creature than is the heart of any other mammal, the quantity of blood contained in the body is much greater; and there are special arteries and veins provided to hold the extra quantity of the circulating fluid.

When the whale comes to the surface of the water to breathe, the aërated blood does not all pass to the heart, and from hence to the system, as in other mammals, but some of it passes to a reservoir provided for it—which reservoir consists of a number of arteries situated at the back of the chest. When the creature plunges beneath the water to obtain its food, or to evade its enemies, the store of pure blood is propelled through the system, and, after being used, is passed into another reservoir of veins, where it is stored up until the animal again comes to the surface of the water. So long, therefore, as there is any oxygenated blood in the reservoir, so long can the creature remain submerged.

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* *Origin of Species*, C. Darwin, first edition.

We ask the evolutionist to say how "Natural Selection" alone provided for the increase of blood in the first instance, and then, when that increase took place, how the special arteries and veins, which should hold it, were made and located? And we should like to know what the ancestors of the present whales did, when, as yet, the arrangements were in their incipient state.

We hold that it is much more reasonable to believe that an intelligent being planned the whole structure at the beginning, and arranged the means to achieve the ends in view—the comfort and the protection of the creature. "We speak as unto wise men; judge ye what we say."

In the next place, let us consider the case of the eye as an organ of sight. According to the doctrine of Evolution, there was a time in the history of the world when all animals were eyeless, and that the first eyes were produced by "natural selection." Now, what does this imply? Nothing less than this. At some time in the far distant past, these sightless creatures became conscious—if one may use such a word—of the existence of light, and were moved by a desire to possess an organ which would enable them to profit by the light. This desire then led to the formation of a nervous centre sensitive to light, and by use this primitive eye-spot, became gradually more and more developed, until, at last, the perfect eye, as now possessed by birds and mammals, was the result. And all this, too, without the aid of any intelligence or power other than that which was inherent in the unreasoning lump of jelly and its successors.

Mr. Darwin himself, with his accustomed fairness, admits the difficulty of reconciling the hypothesis with reason. "To suppose," he says, "that the eye with all its inimitable contrivances for adjusting the focus to different distances, for admitting different amounts of light, and for the correction of spherical and chromatic aberration, could have been formed by natural selection seems, I freely confess, absurd in the highest degree."—*Origin of Species*, p. 146. But how does Mr. Darwin get over the difficulty? By demanding "that our reason should conquer our imagination."

Well, let it be so! Reason says, that a complicated instrument which is constructed on true scientific principles, and which perfectly accomplishes the purposes for which it was evidently made, must have been designed by an intelligent being, and one who must have had the end in view at the time when he drew his plans. Now, the eye is a complicated instrument especially adapted to the purpose of seeing, and every part fulfils its purpose. Reason, therefore, says it must have been constructed by an intelligent being. This is the verdict of reason. The imagination of the evolutionist, on the other hand, sees a multitude of sightless creatures; then, after an immense lapse of ages, a certain number of these eyeless creatures appear with rudimentary eyes. Then in after ages a number of these improve their rudimentary organs—but some, however, do not. Again, the struggle goes on, and after ages upon ages have passed, the more favoured creatures become the fortunate possessors of better eyes; and so on, until at last the wonderful eye of man is the result. A pretty picture this, but it is a picture of pure but unscientific, imagination.

Now, as it is the office of reason to control the imagination, we will allow the master-faculty to fulfil its mission. Reason says every change must have its adequate cause; and so the change from the non-seeing to the seeing, and the possession of a perfect organ of vision must have been effected, not by "natural selection"—which must have been unreasoning,—but by intelligence—by the mind and act of God.

There is another point which should receive attention in this investigation. It is this. There are thousands of creatures now existing—and which, on the showing of the evolutionist, have existed for unnumbered ages, which have but rudimentary eyes—as, for instance, the Medusa. Now, it must not be forgotten that the ancestors of these creatures have been using their rudimentary eyes during all these thousands upon thousands of years which, we are told, must have elapsed since they appeared, and yet not one of them has succeeded in evolving a more complex structure than any of its predecessors. How is this?

Again, the trilobite, one of the oldest of the "Medals of Creation," had compound eyes like those of the insecta of the present day. And there have been creatures in all ages of the world which have possessed compound eyes, who have used them well in the great struggle for life all through the geological and recent ages, and yet they are still the same in structure—no evolution of even an iris or an eyelid.

Again, there are fossil spiders found in some of the older rocks. These spiders have a number of simple eyes. There are spiders still, all of which have eyes of the same kind as their ancient ancestors. And yet all through the long vista of ages, since the time when those fossil spiders lived and crawled amidst the forests of the Miocene period, few creatures have had to fight a fiercer battle than these Arachnida. For all this, however, not one of them has succeeded in evolving a compound eye, with its ten or twenty thousand lenses, as is possessed by the fly which is entrapped in its wonderfully woven web.

Surely, then, if the struggle for existence during many thousands of years has failed to effect any change in the organs of sight in all these creatures, what right has the evolutionist to *assume* that in others there have been all those wonderful changes which his doctrine requires us to believe there have been? We hold that he has no right either to make the assumption, nor has he any right to demand that we shall allow his imagination to dictate to us what our reason disapproves of.

In the next place, let us take the tongue of a woodpecker, a bird which feeds on insects that lie concealed beneath the bark of trees, or on larvæ buried deeply in the substance of the wood. How are these larvæ to be obtained? The hiding-place must be reached. The instinct of the creature determines the spot, and the strong chisel-shaped bill pierces the wood. But the hard, stiff bill cannot be thrust down the deep run of the maggot. Shall another hole be made—and another—until the exact spot be hit upon? No. There is a special contrivance in the mechanism of the tongue which enables the bird to thrust it to the very bottom of the run, and so obtain its food. Look at this contrivance and deny, if you can, the evidence of mind in its construction.

The tongue is really a double one, consisting of two distinct parts—a fixed fleshy base, and a projectile portion which passes through the centre of the fixed portion. The projectile part is prolonged into a double bow, which passes on either side of the larynx and over the bone of the head, and terminates near the nostril in the upper mandible. On the inner side of this elastic bow are muscles which, when contracted, force the projectile tongue forward. Another muscle has one of its ends fastened to the projectile tongue, near the part close to the fixed base; and the other end of the muscle is wrapped round the trachea. By the contraction of this muscle the projectile tongue is drawn in; and so by the alternate action of these two muscles, the long, thin tongue can be projected and retracted with great rapidity. Nor does the contrivance end here. The tip of the projectile tongue is horny and barbed. And further, when the tongue is projected, it rubs against a gland which, being excited, pours out a sticky saliva, which passes to the barbed extremity of the projectile tongue. Here there is a beautiful piece of machinery, admirably fitted to perform a certain set of operations and produce certain results. Reason says that such means to such ends must have been the work of an intelligent Maker. They are stamped with the evidence of mind.

Dr. Haeckel, however, says, No! Nothing of the sort. It never was designed. But this is how it came. In the far distant past some ancient bird thought within itself, could I but find some unknown soft and dainty morsel, I should then be able to satisfy my hunger; and so it set off in search. It lighted on a tree, and heard a mysterious sound under the bark. Can this be what I want? It may be. But how shall I know? Could I but make a hole I should be able to reach the prize. I will try. No! I cannot do it; my bill is soft. But can I not harden it? Yes; I will continue trying to make holes, and in time it will get harder, and perchance grow longer. And so it tried, and failed, and tried again; and after thousands of generations of would-be woodpeckers had passed away, a bird was seen with a long hard bill. Now the struggle to obtain the larva commenced in earnest. A hole was made, and the run of the maggot discovered. Could I only put my bill or my tongue down the cranny, says the acute old bird, I should obtain the wished-for morsel. But my bill is rigid, and my tongue is short. I see! I must lengthen my tongue. But how can this be accomplished? I must continue to try. A thousand generations of birds are hatched, and die, and the prize is not obtained. At last an exceedingly wise old bird conceives the idea that if she could but place the germ of a longer tongue than her own in the next egg which she lays, her progeny would possess longer tongues; and then if these lengthened tongues were constantly used they would, in the course of future ages, be long enough to reach the hidden grub. So conceiving the idea, this wise bird did really place the germ of a long tongue in her eggs; and in course of time, after many failures and many alterations, the woodpecker of to-day is the result.

I am told that this is what I must believe—and nothing else, and if I do not believe this, I must forfeit all claim to be considered scientific, or even rational. But my reason demurs. It says such a theory is unreasonable, because it requires me to believe that the mere desire in some former soft-billed, short-tongued bird, to possess a hard bill and a long tongue, did ultimately produce the wonderful organ which the woodpecker of to-day possesses, not as the result of a presiding mind, but by "natural selection."

It is necessary now to take another step in our investigation. Much stress is laid by Professor Haeckel and other advanced evolutionists on the fact that certain animals possess what are called rudimentary organs, the presence of which, they say, prove the descent of the creature possessing them from other animals who had them as perfect organs.

When we ask, as we have a right, by what means the fully-developed organ became degraded, and so ultimately rudimentary, we are told, in the words of Mr. Darwin, "That disuse has been the main agent in rendering organs rudimentary. It would at first lead by slow steps to the more and more complete reduction of a part, until at last it became rudimentary."

Let us test this assertion by common sense. The boa-constrictor has rudimentary legs in the form of spurs, which are used by the creature when it is hanging on a bough of a tree watching for its prey.

Again. The rudimentary structure is, we are told, the result of the disuse of the fully-developed limb. But what could have induced the possessor of the perfectly-formed legs to have commenced the disuse of the organs? Surely it would have been more conducive to the comfort and welfare of the creature to have continued the use of the necessary organs. But the hypothesis of evolution requires that the limbs should have been disused in order that the spurs may be accounted for, and so the imagination of the evolutionist pictures a time when this supposed action took place, and then he asserts that it was certainly done.

Let us take another example. The Greenland whale has two bones in its hinder part, and we are told that these are rudimentary legs. In this case we are required to believe that the progenitors of the modern whale were four-legged creatures. If so, what could have induced the creatures to have discontinued the use of these necessary organs? and where are the links which are needed to unite the animals with no hind limbs with those which had two fully-developed?

We might reasonably suppose that when these imaginary creatures began the disuse of their hind legs, the *toes* would have first been degraded. For either in walking or swimming the toes are chiefly concerned, and so a race would ultimately have been formed with toeless limbs. Not a single relic of such a race has been found. This is most unfortunate for the evolutionist.

Once more. The horses of the present day have been, we are told, evolved out of an ancient race of three-toed animals, which, of course, used all three when standing or walking. But, somehow or other, all these three-toed animals took it into their heads to lift up the two side toes so that they should not be used. Why this was so we are not told. This is to be lamented; because it would have been a source of satisfaction to know what circumstances induced all these creatures to have simultaneously commenced, and to have continued through untold ages, the very extraordinary procedure! And yet so it must have been, if the assertion of the evolutionist be true.

Let us take one more example; and this is, perhaps, the most extraordinary. We are told that the presence of the rudimentary mamma on the breast of the males of the class Mammalia is a proof positive that they have been evolved from animals which had them fully developed.

Well, of course they have; for every male has descended from his mother!

But this is not what the evolutionists require us to believe. They say the presence of these rudimentary organs is a proof that the males once had these organs fully developed, but by disuse they have become degraded. In other words, there was a time when the males suckled the young. Then, of course, as the mammary glands and the mamma could only have become rudimentary by disuse, there came a time when the males declined to fulfil the duties which they owed to the infants, and so it devolved upon the females.

Now, it must not be forgotten that the hypothesis of Evolution requires that there must have been a transition-state. What would, then, become of the young, poor things! In the case of the improved apes, perhaps they had recourse to a kind of ancient "feeding-bottle." Some fossils of these may, for aught we know, turn up by-and-by. But in the case of the lower orders of mammals, such a contrivance could not have been used, and so the wonder is that any of the poor, deserted infants survived. Pardon the sarcasm! But let us pursue this view of the rudimentary mamma to its legitimate end, and see to what conclusion we shall be brought.

If the rudimentary mamma on the breast of the males were rendered rudimentary by disuse, then there must have been a time when the progenitors of these males suckled the young. But if they ever did suckle young, they must have been *their own young*. For the milk is not perfectly formed by the mammary glands until shortly before the birth of the infant, and the "flow" is not complete until the third day after the birth. So, then, according to the hypothesis, the present males have descended from a race which fulfilled the functions of the females. And as the present females have, of course, descended from a race who were females, there was a time in the far distant past when all the mammalia were females. An evident absurdity!

Then, again, there must have been a time when the progenitors of the present males gradually ceased to perform the functions of females, and were gradually transformed into males. Another evident absurdity! We are bold to say that such a doctrine as this is an insult to the common sense of mankind. And yet this is what Dr. Haeckel must believe if he is true to his own doctrine; and this is what he demands that others shall believe on the pain of being pronounced unscientific. If not to believe such a theory as this is to be unscientific, then we glory in being unscientific. But it is not so. That man is unscientific who allows his imagination to control his reason, and who bases his faith on pure assumptions rather than on facts, and such a man we hold the German professor to be.

But it may be asked, If the present species are not the result of evolution by natural selection, from whence did they spring?

Before answering this question, it will be necessary to ask another, viz., What is a true species? Let the answer be that of Dr. Cook, of Boston:—"True species are such animals as are found within the outermost limits of the sphere of ascertainable variability." Taking this as our guide, let us suppose a number of circles, and in each circle place all the animals of one order, or, if you please, one genus—say the carnivora, or, if you please, the cat tribe, as the case may be; in another circle put the ruminants. We say that there is no evidence of any such species having been transmuted into another. We may even go further, and say that every genus seems to surround itself with a hedge, which renders the transmutation impossible. And so in a natural state each tribe breeds true.

Now, as there is no evidence that species are transmuted, we say that it is both reasonable and scientific to conclude that in the distant past the progenitors of each *true species*—not varieties, but true species—were formed by an Intelligent Being, who worked according to a well-defined plan.

Thus, in the sub-kingdoms of the invertebrated animals there is found a general resemblance; all the radiate animals being formed on one plan and all the annulosa on another.

Again, in the great classes of the vertebrated animals, there is also a general resemblance, the fishes being constructed on one plan, the reptiles on another, the birds on another, and the mammalia on another. And, in accordance with the general plan, we find the presence of certain organs, modified, it may be, to suit the particular habits of the creature. And thus the whole animal kingdom admits of an easy and intelligent classification, which even the youthful student of zoology can understand. Surely such a faith as this is more intelligent and reasonable than that of the transmutation of one species into another by evolution and natural selection, which must of necessity be blind and unreasoning.

There is another point of very great importance in this controversy. It is this. Evolution by natural selection is not borne out by the testimony of geology, or, in other words, by what the rocks declare as to the succession of life on the earth.

We are told by the advanced evolutionist that the changes produced by evolution cannot be tested by the history of animal life in historic times; but if we wish to get any evidence of the truth of the doctrine we must seek it in the treasure-house of geology. Agreed. Let us, therefore, question the rocks, and mark well their answers. In the oldest rocks, at the very bottom of the Laurentian series in Canada, there has been found what is considered to be the most ancient of all fossils. It has been called by Professor Dawson the *Eozoon*, or "dawn of life." The Eozoon is supposed to be the fossil form of a *protozoon*—a species of foraminifera, which, instead of existing as minute microscopic creatures as we find their representatives to-day, were gigantic aggregations of protoplasm, which combined to secrete vast reefs of calcareous shells. Thus much for the first evidence of animal life—a Protozoon.

The Laurentian rocks reveal no further indications of animal life; not one trace of the evolution of an eozoon into any other form. And what is true in the case of the Laurentian series is true also in that next above, viz., the Huronian.

Let us now take another step upwards and question the Cambrian system. Among these rocks, at Bray Head, near Dublin, some remarkable fossils have been found, to which the name of Oldhamia has been given. What is the position of these creatures in the scale of nature? It is now generally admitted that the Oldhamia rank with the Corallines of the present day. The second fossil is doubtless the remains of a more highly-organized animal than the eozoon, and so far seems to favour the hypothesis of evolution.

Let us, however, take another step upwards. Ascending higher in the Cambrian series we find the *third* oldest fossil. And what is it? Not a protozoon, not an hydrozoon, not an actinazoon, not an annuloida, nor an annulosa, but a mollusc. It is one of the most ancient shells, and is known by the name of the "Obolella." It belongs to a group well known to the zoologist as the Brachiopoda, and which holds a position in the scale of organization only a little lower than the oysters and mussels of the present day.

Now every student of zoology knows that there is a wide chasm between the protozoa, or hydrozoa, and the mollusca. If, therefore, the "Obolella" were developed out of an Oldhamia, there must have been many intermediate links. For, according to the hypothesis, natural selection "can never take a sudden leap, but must advance by short and sure, though slow, steps." Is it not very strange and unfortunate that none of these "*sure steps*" are to be found?

Continuing our journey upwards in the series of rocks, and, therefore, onwards in the course of time, what do we find? Not a more highly-developed mollusc, but multitudes of "trilobites," creatures allied to the decapod crustaceans of the present day. True, there are found associated with these creatures fossil sponges and encrinites; but the former belong to the protozoa, and ought, on the hypothesis of evolution, to have been found in the upper portion of the Laurentian, or in the Hurion, while the latter rank with the echinodermata, and ought to have been found much lower down in the series of rocks.

Entering the great Silurian system, most important negative evidence is obtained. In these rocks are found, for the first time, immense numbers of fossil corals, creatures belonging to the actinazoa, and, side by side with these lowly creatures, the evidence of a rapid growth of molluscan life. Here are found the shells which were embedded in the soft tissues of a kind of cuttle-fish, and what mighty cuttle-fish they must have been when their internal shells are found to measure seven or eight feet in length!

Let us linger for a minute to contemplate the exact nature of these cuttle-fish. First, then, we remark, that they occupy the highest position in the scale of molluscan life; second, they approach very nearly in some part of their organization to the vertebrate section of the Animal Kingdom. In these molluscs there is a brain enclosed in a cartilaginous brain-case, and, what is still more important in this discussion, the cuttle-fish has special ganglia for the sole purpose of origin to the nerves of sight. How strange that these highly-formed molluscs should come next to the crustacea. Where is the evidence of the evolution of the one out of the other?

Passing now to the upper portion of the Silurian series, we find the remains of sharks, and of sharks of the highest types. Every student of zoology knows that the brain organization of the shark brings that creature extremely near to the reptiles. Observe, then, that we have here the remains of a highly-organized fish before there are any traces of the lowly. Surely, there, then, we have evolution turned upside down. Where are the links which are needed to connect the fish with the crustacea?

In company with the sharks are found some members of the ganoid fishes, which have their representatives in the present day in the bony pikes of North America. Leaving the Silurian system and entering the Devonian, we find the fossil known as the *Euryptesus*—a monster lobster—which attained the size of 6 to 7 feet in length. Surely the lobsters of the present day are but a degraded, puny race compared with their ancestors. Entering the Carboniferous system, fossil spiders are met with for the first time. Now, surely "natural selection" must have made a mistake here. Spiders evolved out of mollusca or crustacea! This is, indeed, evolution the other way on—a degradation rather than a development. In these rocks a few trilobites are still found, and side by side with the Limuli another set of crustaceans, whose representatives in the present day are the king-crabs of the tropical seas. But though found side by side there is no evidence that the "Limuli" were evolved out of the trilobites.

Taking another step upwards we reach the Permian rocks. Here are found some fossil shells peculiar to this stratum, and also the remains of some reptilian form of animal life allied to the lizards and crocodiles of more recent times. Above these—in the Triassic rocks—are found the footprints of some very remarkable four-footed creatures, whose hind feet were larger than their fore, as is the case in the Batrachians of to-day. Whence, we ask, these four limbs? From what creatures were they developed? Where are the links which unite them with the ganoid fishes? Again: In these same rocks are found the impressions of a three-toed biped, supposed by some geologists to be the footprints of a walking bird; and no mean creature either! For in comparison of which the living ostrich is but a dwarf. Again, we ask, where are the links which unite these gigantic creatures with those animals which have gone before? and why are their representatives such pigmies?

Leaving these Triassic rocks and entering the Oolitic, some remarkable fossils are found. The belemnites and the ammonites tell of the presence of the mollusca; the ganoids and the sharks testify of the presence of the piscerine tribes.

But in addition to these are found the remains of reptiles, both terrestial and aquatic, such as the world never saw before nor since—the ichthyosaurus, the plesiosaurus, the megalosaurus, and the pterodactiles—all testify to the wonderful perfection of reptilian life in those ancient times; but their transition forms are not found.

In these rocks also are found the remains of a most remarkable bird: not the mere footprints, but the fossil forms themselves. The curious creature, which has received the name of the archæopterix, differs from all living forms of birds in the disposition of its tail-feathers. The birds of the present day have all the tail-feathers set upon the last joint of the tail, and upon none other. In the case of the archæopterix, however, it is different; there being one pair of feathers to each joint—ten in number. Now, as there is no evidence that the pterodactyles possessed feathers, and as "natural selection must work by a number of minute changes," where are the links which are necessary, on the hypothesis of evolution, to unite the one with the other? There must have been many links in the evolution upwards, and there must have been many in the process of the degradation of the long-tailed birds into the short-tailed ones of recent times. But none of these links are found. This is most unfortunate; but it is true.

In the same series of rocks are found the teeth and other remains of animals belonging to the class Mammalia, mostly such as are now represented by the Marsupia and Insectivora. Whence they came—that is, out of what previous creatures they were evolved,—is nowhere shown. Another misfortune for evolutionists, yet another truth.

Rising to the Chalk formation, some very remarkable fossils are found—birds whose beaks were furnished with rows of teeth resembling in their structure those of reptiles. Ah! says the evolutionist, here, at least, you have a proof in favour of evolution. Here is clearly a connecting link between the reptiles and the birds.

But, we ask, ought not this link to have been found much earlier? It seems out of place here. It comes in much later in time than the age of the archæopterix. Was not that primitive bird destitute of dental appendages? and besides this there is no evidence that the archæopterix descended from flying reptiles of the pterodactylean age. We hold, therefore, that these toothed birds, instead of proving evolution to be true, become, when viewed in connexion with the period of time at which found, rather a perplexity to the advocates of that theory.

We must now take another step upwards, and pass from the Oolitic system to that of the Tertiary. Speaking of this transition, Professor Williamson says :—"I may observe here that in all probability, if we except some foraminiferous creatures of low organization, no one species of animal that lived previous to the close of the Chalk age survived that period. Except one doubtful shell, all these species found in the Mezozoic strata became extinct. None of them are to be found in the Tertiary strata."

In one sense, therefore, life seems at this time to have begun *de novo,* and the records of these rocks lead us up step by step to the present day. Hence the use of the three terms by the great geologist, Lyell, to distinguish the three main divisions of those rocks : the Eocene—the dawn of recent life; the Miocene—the less recent; and the Pliocene—the more recent.

Now, what is the answer given by these rocks to the question, Is evolution proved? Let us listen.

In the Eocene series are found the remains of fishes—perches and others, all allied to modern forms. Now, also, are found terrestrial and aquatic mammals; the former represented by animals somewhat like the modern tapirs and antelopes, the latter by the zeuglodons—a monster of over seventy feet in length. If these latter creatures had been evolved out of more ancient ichthyosaurus there must have been hundreds of transmutations. Where are these links? We look for them in vain.

Entering the Miocene series of rocks we find a marvellous outburst of animal life—monster mammoths and mastodons, but from what previous forms of mammalian life they were evolved we are not told. On this point the rocks are silent.

Passing from the Miocene to the Pliocene deposits, abundant evidence is obtained of the profusion of animal life. Now are found the remains of true whales, also of many other mammals which are found on the earth at the present time—and not only mammals, but birds, reptiles, and fishes. But from what creatures they were evolved is not revealed, nor yet any of the successive links in the chain of development from the lower to the higher. But we are told by the evolutionist that we must modify our statement that no links are found in the process of development, for Professor Huxley has clearly shown that the horse of the present day was evolved out of the hipparion of the Pliocene age, and this again was evolved out of the anchitherium of the earlier tertiary times.

But this, it must be remembered, is, after all, but an assumption, not a proof.

Referring to this subject, Professor Owen, in his *Anatomy* *of Vertebrates*, vol. iii., p. 792, says:—"These extinct animals differ from each other in a greater degree than do the horse, the zebra, and ass, which by Professor Huxley are acknowledged as true species."

Again, it has been well said:—

"There is a want of reliable evidence in the case of Professor Huxley's theory of the descent of the horse, because:—

"1. There are remains of the horse in the Upper Miocene period, which resembles, in nearly every respect, the horse which to-day runs wild in Asia and Africa.

"2. There are remains of the hipparion found in the same deposit as the horse, viz., in the Upper Miocene.

"3. Now this proves that the hipparion could not have been the ancestor of the horse. For, according to the hypothesis of evolution, there must have been many intermediate stages.

"4. The remains of the anchitherium are only found in the Lower Miocene: so that there is a wider gap between it and the hipparion than between the latter and the horse."

It is worth while to mark well the reasoning of the evolutionist here. According to the theory, the anchitherium ought to be the ancestor of the hipparion, and the hipparion the ancestor of the horse, which, in both cases, it is difficult to see how they could have been. But inasmuch as on the hypothesis they ought to have been, therefore the imagination is allowed to control the reason, and so what ought to have been must have been, notwithstanding any obstacles whatsoever. Enough has been said to show that the testimony of the rocks gives little, if any, countenance to the doctrine of evolution, and if these witnesses do not agree, to what others can we apply? Surely none.

Having shown that in regard to the organization of the lower animals evolution has been found wanting, we will proceed to test it in regard to man's physical nature.

This is a very important part of the subject, and one on which some eminent evolutionists are not agreed.

Professor Tyndall, in his celebrated Belfast address, when speaking on the subject, says:—"Natural selection acts by the preservation and accumulation of small inherited modifications, each profitable to the preserved being." And Mr. Wallace, an evolutionist, says:—"It is a fundamental doctrine of evolution, that all changes of form and structure, all increase in the size of an organ, or in its complexity, all greater specialisation or physiological divisions of labour can only be brought about, inasmuch as it is for the good of the being so modified."

If this be the case, then the modifications which must have taken place in the physical character of the apes while in their transition state, could not have been for their good.

Two or three points will make this clear. And first, as to the loss of hair on the skin. Mr. Wallace's remarks on this subject are very valuable. In his *Limits of Natural Selection as Applied to Man,* he says:—"It seems to me, then, to be absolutely certain that 'Natural Selection' could not have produced man's hairless body by the accumulation of variations from a hairy ancestor. The evidence all goes to show that such variations could not have been useful, but must, on the contrary, have been to some extent hurtful. If, even, owing to an unknown correlation with other hurtful qualities, it had been abolished in the ancestral tropical man, we cannot conceive that, as man spread into colder climates, it should not have returned under the powerful influences of reversion to such a long persistent ancestral type. But the very foundation of such a supposition as this is untenable; for we cannot suppose that a character which, like hairiness, exists throughout the whole of the mammalia, can have become, in one form only, so constantly correlated with an injurious character as to lead to its permanent suppression—a suppression so complete and effectual that it never, or scarcely ever, reappears in mongrels of the most widely different races of man." This is, we think, a most important admission to be made by an evolutionist. In the second place, the shortening of the forearms and the conversion of the hind-thumbs into toes, and the hind-hands into feet, must have been a dire calamity to a race whose food could best be obtained by climbing. When speaking on this subject, Mr. Wallace makes a most important admission. He says:—"Again, the hand of man contains latent capacities and powers which are unused by savages, and must have been less used by palæolithic man and his still ruder predecessors. It has all the appearance of an organ prepared for the use of civilised man, and one which was required to render civilisation possible. Apes make little use of their separate fingers and opposable thumbs. They grasp objects rudely and clumsily, and look as if a much less specialized extremity would have served their purpose as well."

In the third place, evolution will not account for the brain capacity of man's skull. The *average* internal capacity of the cranium in the different races of men has been found to be as follows:—The Teutonic family, 94 cubic inches; the Esquimaux, 91; the Negroes, 85; the Australian, 82; and the Bushmen, 77 cubic inches. Individuals, however, have been found to possess skulls of much larger measurement. But it may be asked, What proof is there that the ancient races of men had equally well-developed brains? We answer all the evidence that is needed. Some time ago a skull was found in the lake dwellings of Switzerland, supposed to have belonged to a man who inhabited that country in what is called the Stone age, and this skull corresponds in size and character with the Swiss of the present day.

Another celebrated relic known as the Engis skull, which, according to the testimony of Sir John Lubbock, was contemporary with the mammoth, is yet, according to the opinion of Professor Huxley, "a fair average skull, which might have belonged to a philosopher, or might have contained the thoughtless brain of a savage."

So much, then, for man. Now, as to the skulls of apes. The adult male ourang-outang is quite as large as a small-sized man; the gorilla is larger; yet the former has but 28 inches of brain capacity; the latter only 30 to 34½ inches.

Again, the lowest races of men have five-sixths of that of the highest races; while the highest races of apes have scarcely one-third the capacity of man.

The brain of savages varies in size. A negro has been found with 105, and an Australian with 104 cubic inches. It is certain, then, that these individuals had a development of brain which could be of no use to them as savages. How did they obtain it? If they inherited it from their progenitors, then those individuals must have been very far removed from the highest apes of the present day: for it has been shown that the gorillas have but 34 inches of brain capacity. Nor can the great capacity be the result of great mental exertion, for as savages they would never have been engaged in such work. In view of this wonderful brain capacity of the savage races we are, we think, justified in saying that there is more proof that the present savage races of men have been degraded from more civilized races than that they were once apes. It is, we hold, rather a case of degradation than of development.

Another point of great importance in this investigation is the character of the organs of the voice, and the faculty of speech in man.

When speaking of this Professor Mivart, in his *Lessons from Nature,* well says:—

"First. The brutes are all without true language—that is, sounds which are rational and articulate. It is by means of this language that our feelings, memories, thoughts, and volitions are made manifest to the senses of other men, and by which we ourselves learn other men's feelings, memories, thoughts, and volitions. We are bold enough to assert that this rational language is peculiar to man. That brutes have a language is not denied, but no brute is found possessing rational language.

"This distinctive feature of man is a point that Mr. Darwin, in his *Descent of Man,* endeavours to account for in two ways, which, to say the least of them, are contradictory; thus, in vol. i., p. 54, he attributes the faculty in man to his having acquired a higher intellectual nature; while in vol. ii., p. 391, he says his higher intellectual nature was the result of his having acquired the faculty of speech.

"In this possession of rational speech there is a wide chasm between man and brutes— a chasm which has not been bridged. What has been attempted is only groundless speculation, such as that made by Mr. Darwin in vol. i., p. 56, where he says 'That primeval man, or rather some early progenitor of man, probably used his voice largely, as does one of the Gibbon apes at the present day, in producing true musical cadences— that is, in singing; we may conclude from a widely-spread analogy that this power would have been especially exerted during the courtship of the sexes, serving to express various emotions, as love, jealousy, triumph, and serving as a challenge to their rivals. The imitation by articulated sounds of musical cries might have given rise to words expressive of various complete emotions.' *Might* have! But what proof, we ask, is there that it did? Mr. Darwin says in another place, 'It does not appear altogether incredible that some unusually wise ape-like animal should have thought of imitating the growl of a beast of prey, so as to indicate to his fellow monkeys the nature of the expected danger, and this would have been the first step in the formation of a language.'"

To this conjecture we demur, and, we ask, what data is there to warrant such a supposition? None is given. It is another case of the imagination controlling the reason. If an exceedingly wise ape in the past did what Mr. Darwin supposes was done, why does not some equally wise ape in the present do the same, and a race of apes be formed who have the faculty of speech? Why not, we ask? and we wait for an answer.

Much might be said as to the impotency of evolution, as taught by Professor Haeckel, to account for man's mental and moral nature, but as that branch of the subject would require time to investigate, it must for the present be left unnoticed. It only remains, then, to make a summary of the reasons why we consider that the doctrine of evolution as taught by Professor Haeckel is not worthy of support, and—

1. The main argument adduced for its proof is unsound. If life was not introduced on our planet by God, "the Lord and Giver of Life," it must have originated by mechanical forces. But spontaneous generation, *i.e.*, life as the result of mechanical or chemical forces, has never been known to occur; therefore, as life did occur, it must have been introduced by God. We hold, then, that it is more reasonable and more scientific to accept the doctrine of the special creation of life by the Great First cause than to accept the hypothesis of evolution as taught by Professor Haeckel.

2. The doctrine of evolution is opposed to human reason. Reason demands an adequate cause for every effect. We are surrounded on all sides with life, organisms, forces, which could not have been the result of mere molecular motion or combination. It is, therefore, more in harmony with reason and science to believe that all these changes have been the result of the power of an Almighty Being, than to attribute them to blind unreasoning evolution by natural selection, resulting in the "survival of the fittest."

3. We see that in nature there is no such thing as selection to produce generic change: all animals produce progeny after their kind, and never go beyond their kind in fulfilling the law of their being. And so we hold that it is more reasonable to believe that they always did this than to believe that at some time in the distant past their nature in this respect was different from what it is at the present time.

4. Geology gives little, if any, support to the development theory. Species are found in their perfect state. The lowly-formed are found side by side with the more complicated organisms; and the links between the simple and the complex structures are not to be found. In addition to this, the testimony of the rocks is in favour of sudden outbursts of life at different periods of the world's history. Now, such conditions as these are quite in harmony with the doctrine of special creation of typical species of animals by the power and wisdom of an intelligent First Cause, the Lord God Almighty, who is the author and giver of life.

5. The physiological condition of man cannot be satisfactorily accounted for, either by evolution or natural selection, but can be by the belief in his descent from a pair who were made perfect at first by the fiat of an Almighty Being.

Such a faith as this is, we know, considered folly by Professor Haeckel, who says:—"It is much more to my individual taste to be the more highly-developed descendant of a primæval ape ancestor, who, in the struggle for existence, had developed progressively from lower mammals, as they from still lower vertebrates, than the degraded descendants of an Adam, god-like but debased by the Fall."* Well, let it be so, as far as the professor is concerned. We are content to rest our faith on divine revelation rather than on the assumptions of science falsely so called. We would, however, ask the professor, and those who accept his teaching, what benefit can accrue to the human family by believing that man has been evolved out of a race of brutes—may we not say a race of beasts? Can the belief in the bestial descent of man even tend to raise him in the intellectual and moral scale? We trow not. Will such a view of man's origin and destiny ever make a man one whit the kinder or purer? We think not. Will the belief that man has sprung from a lower race of animals, and that he must of necessity share the fate of the lower, ever tend to elevate an individual or a nation? We trow not. But how different will be the effect of the doctrine of a special creation! Does a man believe that he has a noble pedigree? Then he will endeavour not to dishonour it. Does a man believe that he has a noble destiny? Then he will endeavour to live as becomes a being who has. Does a man believe that his race had such a noble beginning, and may have such a glorious end? Then he will seek to teach the same faith to all those with whom he comes in contact. And thus the individual, and the race may be led to raise themselves to their proper level,—a true and noble development—the level of a higher—the highest—even God, "in whom we live, and move, and have our being."

The CHAIRMAN (Mr. J. E. Howard, F.R.S.): I am sure that all present will agree with me when I say that we are exceedingly obliged to Mr. Hassell for having, in his able paper, summarised many of the most powerful arguments against the doctrine of evolution. I agree with the whole of what he has read, with the exception of the little note that appears on the first page, and I look upon that in the light of a "sop thrown to Cerberus," though I doubt very much whether Cerberus is likely to take it.

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* *The Evolution of Man*, vol. ii. 540.

In dealing with Haeckel's doctrine he has taken simply the consistent doctrine of evolution, all the others being, to my mind, utterly inconsistent and self-contradictory. Evolution is a dream, founded on nothing—certainly not on facts; for in whatever direction one looks in order to compare it with facts, it breaks down. The reason why it is so popular is that it is the fashion. We need not be ashamed to be laughed at for not going with the fashion, which certainly seems to be as powerful with men as with women. I, for one, am most heartily glad to be out of the fashion. I should be ashamed of my own reason if I believed in the doctrine of evolution at all; because, as I have just said, it is utterly inconsistent with facts: and, if I know anything about science, it is this, that science consists of knowledge which is gradually built up from the observation of facts until you come to a superstructure of proof, not worked out, as in the case of evolution, from a *dream* in which all the facts are imagined to coincide with preconceived hypotheses. I can fully sustain Mr. Hassell in what he has said with regard to the admirable experiments made by Professor Tyndall and the proof he has been enabled to furnish that spontaneous generation cannot be shown to exist. I was present and heard the discussion which took place before the Royal Society when these very able and admirable experiments were put before us by Professor Tyndall. In consequence of what then occurred I wrote to Professor Tyndall, and said that with regard to this point I was thoroughly satisfied that his experiments had not only been admirably conducted, but had led to very conclusive results with regard to the question of spontaneous generation. I would only say further that I think the geological argument is as perfect as any part of Mr. Hassell's paper.

Mr. C. PFOUNDES (Memb. R. Asiatic Soc.): I think the opening sentence, and the concluding paragraph of Mr. Hassell's paper, have very ably and admirably put before us thoughts well worthy of being placed on permanent record, and translated into many tongues for the benefit of young and old of all nations and creeds. Speaking as one of the general public rather than as a scientist—although I have taken some trouble in America, as well as in England and elsewhere, to ascertain what they have to say for the information of one who is altogether unbiassed by preconceived notions and theories—I think that the evolutionists are to be divided into two distinct classes. One of these is composed of the real men of science, who look for something they are in want of, and with whom the wish is frequently father to the thought, let their motives be ever so admirable; the other consists of those lesser lights who would fain shine alongside the scientists with the same brilliancy—men who are mere seekers after reputation and fame, and who are well pleased if they can only gain notoriety. We must deal with these people exactly on their merits, having regard to their own statement of their own case. I, as an Orientalist, have been brought face to face with records of some of the ablest men of the olden time—the "wise men of the East"—and, from what I have there read, have been led to the belief that the evolutionists of the present day are inferior to hose old writers, and more contradictory to their own theories. We are now told that, step by step, evolution has gone on producing developments that have led up to the noblest animal, and yet they say that this noble creature is still imperfect in details which anatomists understand, and which I will not endeavour to explain; yet they claim for their own generation a wonderfully sudden development of intellectual power. I quite agree with the passage in which the lecturer says, speaking of God's creation of man: "A noble creature this! an origin which indicates both a divine ancestry and a glorious destiny." I will not quote the concluding paragraph; but I have here, in my hand, a book nearly a century and a half old—a book unbiassed by any of our Western theories—in which it will be seen that the people of the East claim for themselves a noble origin, for they refer to their ancient records, and, throwing overboard Buddhism and superstition, they claim to go back to the faith of their fathers, who tell them "you are of a divine ancestry, worthy of a noble and an intellectual race." I think, therefore, that when we find quasi-scientific writers tackling us upon our creed as Christians, we have a right to ask, is it not fair that we should take them to these non-Christian sources, and there meet them with their own weapons? If our scientists will only go to the East, and inquire into these things, they will learn something that may help to prevent their putting forward facts in a manner which simply misleads our young people, who are nowadays going so far astray, that I regret to say, after having passed part of my life in Eastern and non-Christian countries, I feel almost ashamed of my own countrymen, and the insincerity of their belief.

Mr. T. K. Callard, F.G.S.:—I think that Mr. Hassell, in his very able paper, has succeeded in showing that evolution, as taught by Dr. Haeckel, is not only at present unproved, but is not very likely to be proved in the future. It strikes me that the method Dr. Haeckel adopts of adding assumption to assumption, where there is no evidence to guide him, is most unscientific. On the second page of the paper we are told that Dr. Haeckel says:—"There is no doubt that man is descended from an extinct mammalian form, which, if we could see, we should certainly class with the apes." "There is no doubt," says Dr. Haeckel; but why does he say there is no doubt? Dr. Virchow, a man well known as a naturalist, says in connexion with this question of evolution,—"We must really acknowledge that there is a complete absence of any fossil type of a lower stage, in the development of man"; and Professor Boyd Dawkins says of the miocene and pliocene apes:—"There is no tendency in them to assume human characters." And yet, in the face of all this, Dr. Haeckel says:—"There is no doubt!" Then Dr. Haeckel goes on to say:—"It is equally certain that the primitive ape is in turn descended from an unknown semi-ape, and the latter from an extinct pouched animal." There I agree with him—it is "equally certain" for there is no certainty in either statement. I will now refer you to page 257, "step 19," where Dr. Haeckel is quoted as having stated that:—"There do not exist direct human ancestors among the anthropoids of the present day, but they certainly existed among the unknown extinct human apes of the miocene period." Now, how could these "unknown" apes be the direct ancestors of man if they became extinct in the miocene period? All attempts to prove that man lived in the miocene period have completely broken down, and the work supposed to have been done by man—those chipped flints that were alluded to some time ago as presumed evidence of human handiwork—is now, by almost common consent, attributed either to dryopithicus—an anthropoid ape—or to natural causes. There is no proof of man having lived in the miocene period. Then, if these apes became extinct in the miocene, how, I ask, could they have been the direct human ancestors of man, who did not appear until the pleistocene period? Mr. Hassell has very forcibly shown the unphilosophical position of supposing spontaneous generation to be the beginning of life, when experiments have now proved that spontaneous generation does not take place. Every hermetically-sealed tin of meat that is brought into this country from Australia is a protest against the doctrine of spontaneous generation, and the followers of Hutton, Playfair, and Lyell should be the last to believe in a physical law operating in the far past, which has no existence in the present. It is most unphilosophical, and altogether contrary to uniformitarian views which, at other times, they put forth. Again, it is strange that Dr. Haeckel should hold on to "bathybius," after Professor Huxley, who invented him, has had to give him up. On page 276 there are one or two points I wish to notice. Mr. Hassell has supported the position I took in my last paper, namely, that there was a break in the continuity of life during the cretaceous period which is fatal to Dr. Darwin's theory of evolution. Mr. Hassell quotes Professor Williamson, who says:—"I may observe here, that in all probability, if we except some foraminiferous creatures of low organization, no one species of animal that lived previous to the close of the chalk age survived that period. Except one doubtful shell all these species, found in the mezozoic strata, became extinct. None of them are to be found in the tertiary strata." If Professor Williamson is right the hypotheses of Darwin and Haeckel are wrong, for, according to both hypotheses, there must be no break, in the one till we reach the ascidian mollusc, nor in the other until we come to bathybius, who Professor Huxley had to renounce at Sheffield, as a naughty boy who could not be found when he was wanted. The author says, in the sixth paragraph: many pliocene mammals are found on the earth at the present time. He has kindly given me privately his authority for saying so. It is that of Sir Charles Lyell in his *Antiquity of Man*, and the evidence rests on certain forms of life found in the Cromer Forest beds; it is important to call attention to this, as it has a bearing on the last paper read here; but Sir Charles Lyell, after stating this, found certain modern shells without any admixture of extinct species, which led him to say:—"I am in doubt, therefore, whether to class the forest beds and overlying strata as pliocene or to consider them as passage beds between the newer pliocene and past pliocene periods." That, of course, would make all the difference. I may add that I have given this quotation from the second edition of Sir Charles Lyell's book, published in 1863. Seventeen years afterwards, in 1880, Professor Boyd Dawkins, in his *Early Men in Britain*, without hesitation, placed the forest beds in the pleistocene period; and his zoological argument for the non-existence of man in the pliocene is, that only one pliocene form now lives, at any rate in Europe. This, I think, will strengthen the position of Mr. Hassell. (Applause.)

Mr. William Griffith:—Wishing to do no injustice to Haeckel, I obtained a copy of his work, and may unhesitatingly say that the basis of his theory is atheism. If that basis fails his theory falls with it, as the superstructure cannot stand when the foundation is removed. There is no doubt that there are difficulties with regard to the theistic theory, but, at any rate, it is sufficient to explain, or account for, the problems of human and other life existing around us. It helps to elucidate the difficulties of the past, to clear up those of the present, and at the same time, affords hope for the future. The atheistic theory, however, does not explain these difficulties, but ignores the hopes we may cherish, and the arguments for the existence of the infinite power and goodness of a Supreme Being, to be derived from the evidences of adaptation and design which have been so ably treated by Paley. At the present day it may be the fashion to depreciate the argument from design. But its great expounder, Paley, was a man of high mathematical talent; and the argument he brought forward was not new, and does not rest upon his work alone, inasmuch as the most celebrated of all physicians, Galen, who was a heathen, dwelt with great force upon it, and sixteen centuries before Paley flourished, "felt that in writing his anatomical treatises he was composing a hymn to the Deity, that a declaration so plain of the wisdom, the power, and the goodness of God was an act of piety and praise."* Of all physicians in ancient or modern times, the works of none have more extensively influenced the branches of medical science than those of Galen. To leave this general view of the subject, and to deal more specifically with the view of evolution adopted by Dr. Haeckel; it will be seen that his theory starts with the proposition that life arises from spontaneous generation. Now the experiments of Dr. Tyndall, and other experiments that have been made in the same direction, have proved, as a matter of fact, that spontaneous generation cannot be produced. But what is it that this so-called spontaneous generation demands in its origin? It demands that atoms of matter should possess certain qualities which have a creative power. Now, I would ask, which is the more reasonable assumption—that one Creator made all the varieties of matter and modes of life which we see around us, or, that we have thousands upon thousands of atoms which have endowed themselves with these perpetually creative properties? But even if, for the sake of argument, we admit the theory of spontaneous generation, we have no absolute ground upon which we can set our foot. Before anything can be generated we must have had these atoms of matter; but whence do these atoms come? How can you explain the coalescence of these atoms in the case of the immense orbs that circulate around the sun? How do you explain the laws of gravitation which hold them together—laws which it required a Newton and a Kepler to discover. How the initial force which still keeps them in their orbits, and prevents them gravitating pell-mell to the centre? These atoms of matter could not have impressed the laws of gravitation upon themselves; they could not direct the course of the planets round the sun. All this must have come from an external source; therefore, the origin of matter and all the great problems of astronomy are unaccounted for by the theory of evolution, and exist independently of the theory of spontaneous generation. The only explanation Dr. Haeckel offers is that matter began to differentiate. To differentiate is to produce a difference, according to the ordinary use of language; but, as Dr. Whewell has well asked in his *History of Inductive Science*, "What principles produced these differences?" There must have been some active principle at work, otherwise these differences could not exist. And if matter were able to differentiate at so early a period, why does it not continue to differentiate now? Why do we not see molluscs developing themselves into men? Why are we not able to observe the process by which one species of animal changes itself into some other species? This is a very reasonable question, and one that should have an answer. If matter can differentiate itself at one particular epoch in the world's existence, why does it not do so at the present time? and why, also, do we not see those intermediate changes which are so readily assumed, but of which we have no evidence whatever? It is to be remembered that there are only a few philosophers—so called—who take the view advocated by Dr. Haeckel. The greatest physiologists of the present day are against it. Not only was Dr. Whewell opposed to it, but "he considered it unnecessary to point out how extremely arbitrary every part of this scheme is, and how complex the machinery would be even if it did account for the facts; that it is sufficient to observe, as others have done, that the capacity of change and of being, influenced by external circumstances such as we really find in nature, and such as in science we must represent it, is a tendency not to improve but to deteriorate";* and we also find men of such high repute as Dr. Carpenter, Registrar of the University of London, and one of the leading physiologists of the present day, laying down, as an axiom, that all the ultimate facts of creation which we cannot explain, and which we must admit, involve the idea of creation by some external power. "All sciences have their ultimate facts for which no other cause can be assigned than the will of the Creator; and that of the existence of the properties of the different kinds of matter, and the determination of the conditions of their action, we can give no other account than that the Creator willed them to be so."*

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* Watson's *Principles and Practice of Physic.*

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* *History of Inductive Sciences*, iii., p. 628.

The Chairman (Rev. R. Thornton, D.D., in place of Mr. J. E. Howard, F.R.S.).—As I am now occupying the Chair in place of Mr. Howard, I may be expected to supplement what he has said with a few remarks. I confess I am one of those somewhat amphibious animals of whom Mr. Howard seems to have so great a detestation—those who are a little inclined towards the doctrine of evolution, not as it is taught by Dr. Haeckel, but as under certain restrictions. It is a matter of indifference to me, so long as I believe in one Supreme Intelligence, whether it pleased Him to carry out the work of creation by way of evolution or development, or otherwise. Given a Divine cause for development, and I am satisfied with the theory; but there is an old axiom which I learnt in my early studies of mediæval philosophy, *ex nihilo nihil fit;* nothing can come out of nothing. I confess I have been surprised, on referring to the works of evolutionists, to find how entirely they set that old principle at naught. They as good as tell us that the best way to get something is to have nothing, and it would doubtless be a most satisfactory thing in the matter of finance if it were so. (Laughter.) But how do they put the proposition? They say, we want to account for the existence of life. Where do we seek for it? Not in something living, but in something which has had no life. We want a high organization: whence do we get it? From protoplasm or bathybius. We want intellect: where do we go for it? To the germs of intellect in the unintellectual ape, or to a still less intellectual source. I am wholly at a loss to understand how they can speak of something brought out of nothing. And there is another difficulty, which I think the able author of this paper might make some remarks upon: the evolutionists have not attempted to account for the whole of the phenomena of life which exhibit themselves. They do not account for the processes of degradation which we constantly see around us. The phenomenon of degradation is not an uncommon one; and yet, although the evolutionists tell us of the persistence of species, which they say were formed, and have reached their present condition, by the survival of the fittest, they have not in any way endeavoured to account for the degradation that has taken place. They can hardly call the degradation of species the survival of the fittest. Whether they will reply that degradation fits a degraded state I do not know; but the point is one that is certainly very difficult to understand. I do not think there have been any objections made to this paper; on the contrary, it appears to me that all the remarks which have been made, have been in its favour.

Mr. Hassell.—If the meeting will bear with me a little longer, I have to show it one or two diagrams of those creatures which, we are assured, are the true ancestors of man, and which we are called upon by

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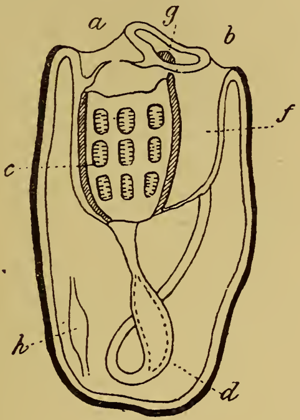
* *Manual of Physiology, including Physiological Anatomy,* p. 13.

Dr. Haeckel to accept as such. The first is the *Tunicata*, one of the Ascidian molluscs. The part marked *g* is supposed to be the rudimentary brain, and that marked *c* the rudimentary lung.



TUNICATA.

a Oval aperture. *b* Atrial aperture. *c* Pharyngeal, or branched sac, with its rows of ciliated apertures. *d* Alimentary canal, with its hamal flexure. *f* Atrium *g* Nervous ganglion.

This creature is, you will perceive, most unlike a man, and not very much like a fish, yet we are told that we are to believe, or else be considered unscientific, that from it was produced the first primitive vertebrate animal, the lancelet, and that from this, in process of time, sprang all the classes, orders, and species of the sub-kingdom Vertebrata. This creature, you will observe, is one of negation: without eyes, without heart, and without back bone; and yet Dr. Haeckel calls upon us to revere it as being our progenitor. The learned Doctor may do so, but I cannot. At this late hour it would be impossible for me to go into the question of the degradation of organs to which our Chairman has referred to, suffice it to

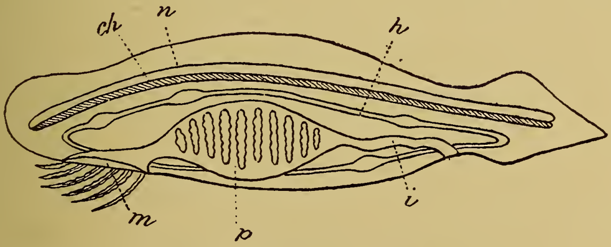


DIAGRAM OF THE LANCELET (*Amphioxus*).

m Mouth surrounded by cartilaginous cirri. *p* Greatly-dilated pharynx, perforated by ciliated clefts. *i* Intestines. *h* Hamal system, with pulsating dilations. *ch* Notochord. *h* Spinal cord.

say that we are called upon to believe that some animals ceased to use certain useful organs, and thus those parts became degraded ; and the degraded parts were reproduced, and thus became persistent. Very much more might be said on this important subject, but it is not possible to cover the whole ground in the time allowed for one lecture. I thank you very much for your patience, which I am afraid I have tried, but hope that what I have put before you will make you think on this important subject.

The meeting was then adjourned.

ORDINARY MEETING, MARCH 6, 1882.

T. K. CALLARD, ESQ., F.G.S., IN THE CHAIR.

The minutes of the last meeting were read and confirmed.

The following paper was read by the Author :—

THE SUPERNATURAL IN NATURE. By JOHN ELIOT HOWARD, F.R.S., F.L.S.

I.—*Introduction.*

THE title which I have chosen for this paper directs attention to a remarkable work by the Rev. J. W. Reynolds,* which has reached a second edition, in which form it has both pleasantly and profitably occupied my attention. I have not the least acquaintance with the author; but would wish to welcome him as a distinguished fellow-labourer in the work in which we are engaged, and to commend his book to the perusal of its members.

I was about to say *thoughtful* perusal, but this would be superfluous. If read at all, it must be thoughtfully; for the rich and fertile mind of the writer is well adapted to become the occasion of thought in others, and his arguments appear generally unanswerable.

Such, at least, is my judgment, on a calm review of the whole. Failures and imperfections must be expected in a work of 500 pages; which would be much improved by condensation. Let us, before investigating these, record some of the conclusions to which this gifted mind is led.

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* *The Supernatural in Nature: a Verification by free use of Science.* By J. W. Reynolds, M.A., Vicar of St. Stephen's, Spitalfields. Second edition, 1880.

I shall not undertake a regular and complete review of the work of Mr. Reynolds; but, as of most importance, take first his remarks (p. 499) on "The Character of Christ":—

> "The Holy Personality was not the slow combined product of a world-spirit, stirring, with high culture, a greatly-gifted race; nor a moral development equipped in the school and cultured in the palace. Jesus, the child of poor parents, educated as a carpenter's son, nurtured in Nazareth, of almost homeless poverty; was it possible for such a child, if but a child, to become that God-Man of work so mighty? Contrast his humility with Jewish pride, his charity with their fanaticism, his expansiveness with their narrowness: you will say that he is one whom they could neither produce nor invent. The prophesied of, yet secret One,—ever hidden from their eyes; their honour and their shame; inextricably woven into their history, yet always nationally refused. For nineteen hundred years he has been the centre and cause of all moral and spiritual development amongst the wisest nations, outside of these nations exists little knowledge . . . . yet, except in early childhood, he never stepped beyond the confines of Palestine.
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> Time chronicles centuries, myriads die; Jesus, imperishable as gold, lives for ever; binds the heart of the world to Himself with electric chains; tells how the soul, weak and wandering like a storm-driven bird, may nestle in the bosom of our Holy Father. In the spirits of men, where sin has opened an unfathomable depth of anguish, he causes streams of consolation to flow, and fill that depth. He makes our eye to sparkle with light, and our cheek to glow with the strangely sweet aspect of those who look into far-off worlds, and gladly hasten thither."

This, then, is the highest *supernatural* in *Nature, God** *manifest in the Flesh,*—altogether miraculous and yet altogether fore-ordained by God, and the result of his purpose from the beginning; the unfolding of the hidden *nature* of God, for God is love. If this be indeed true, then it follows that in a divine sense it is *most natural* that his love should have found out this stupendous plan to save a lost world.

How *naturally*, in this sense, does Jesus teach us about it all in that beautiful parable in Luke xv. respecting the lost sheep and the shepherd! Was it not the self-same one who made this enigmatic world who gave the parabolic explanation?

II.—*Need of Definition in the Terms employed.*†

I could have wished that the author, whose works I am considering, had given us in the first instance a clear

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* For this as the true reading, see the *Quarterly Review*, October, 1881.

† I think that as a Philosophical Society we should endeavour to establish a more accurate style of phraseology than that which we meet with in popular language.

As regards the two words, *Nature* and *Supernatural*, I have followed out definition of the words *nature* and *supernatural.* Perhaps in this I am too exacting; but as my tendency is towards the analytical rather than the synthetic view of things, I wish to know in the first place what we all mean by the words we use.

Our author says, "We do not deal with the controversies amongst believers, nor with scepticism in some of its rationalistic doubts, but with those who deny supernaturalism, who refuse to believe in a personal God, our Creator, our Preserver, our Father" (p. 3).

That nature is the *constituted order of things* is a definition which cannot be accepted by these, for it implies the existence of a Being that has constituted all things as they are. On the other hand, *we* cannot accept the definition that nature is the *order in which things have constituted themselves.*

We start asunder thus at the very opening of the question. We look on things, as they exist, with different eyes; and the sentence I have quoted shows the belief of the writer that there is a fault not in the head, but in the heart, of those who do not see as we see.

They give us ever-increasing evidence of the marvellous perfectness of design and adaptation in those things which meet our observation; and even more especially in those parts of the universe, whether the infinitely great or the infinitely little, which lie outside the ordinary experience of humanity.*

And, they ask us, "Why, if all these things are 'constituted,' as we say, by an infinitely wise Mind, is there so much of evident evil and misery; especially in man, who must, by consent of all, be considered the crowning work of the whole?"

To this the sentence quoted gives an implied answer, that these persons are wrong in not accepting the explanation, which we believe to have been given by the Creator himself, in another revelation, without which the present visible *Kosmos* is but an insoluble enigma.

In this revelation we are told that "The invisible things of

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a line of research from sheer love of the subject, without any notion of being able, without co-operation of others, to arrive at any such accuracy as I desiderate in definition.

Perhaps the question may now meet with more successful treatment by those who I may hope will follow me in the direction indicated.

* The Duke of Argyll well says:—"The new discoveries which science is ever making of adjustments and combinations, of which we had no previous conception, impress us with an irresistible conviction that the same relations to Mind prevail throughout."—*The Reign of Law*, p. 36.

God from the creation of the world are clearly seen, being understood by the things that are made, even his eternal power and Godhead, so that they are *without excuse.*"

But this our revelation tells us also that this present world was made subject to vanity; that it groaneth and travaileth in pain together, until the time of restoration of all things from the evil wrought by the entrance of sin.

There is, then, no common ground on which we may stand, and common terms are wanting. Not only so; we profess that it is by *faith* that *we* understand that the worlds were framed by the word of God; but *agnosticism* is the avowal of *absence of faith;* that is, of the power to apprehend the things that we believe.

We look, then, on the *Kosmos,* or, if you will, on Nature, with different eyes; and before we can settle the question, "*Which is colour-blind?*" must decide what is to be done in reference to this other revelation of God, to which we give in our adhesion and they not.

But let it first be conceded that there can be no possible compromise. Either the believer is right or the agnostic is right. The vast number, who hover in a kind of cloudland between the two, are self-condemned by their own want of courage and of adhesion to the logical results of their opinions.

The true agnostic agrees with St. Paul, in saying that the natural man *understandeth not* the things of the spirit of God, neither *can he know them,* because they are spiritually discerned. Mr. Reynolds says well:—

> "The truths are objective; true before they are believed, and true, even after faith in them is lost. They are subjective also; their influence being the result of immediate operation by the Holy Ghost on the human heart and conscience. This must be remembered in dealing with opponents of Scripture: we shall not prevail with them unless we win our way into the conviction of their intellect, and into the affection of their will" (page 492).

Let us consider a little more closely the terms "nature," and "supernatural." How are they to be distinguished?

Listen to the Duke of Argyll (the italics are mine):—

> "The supernatural: What is it? What do we mean by it? How do we define it? M. Guizot tells us that belief in it is the special difficulty of our time; that denial of it is the form taken by all modern assaults on Christian faith; and, again, that acceptance of it lies at the root, not only of Christianity, but of all positive religion whatever. These questions, then, concerning the supernatural, are questions of first importance. Yet we find them seldom distinctly put, and still more seldom distinctly answered. This is a capital error in dealing with any question of philosophy. Half the per-

plexities of men are traceable to *obscurity of thought hiding and breeding under obscurity of language.*"

Two other extracts from the same author will show how he attempts to clear the difficulty:—

"But let us observe exactly where and how the difficulty arises. The reign of law in Nature is, indeed, so far as we can observe it, universal. But the common idea of the supernatural is that which is at variance with natural law, above it, or in violation of it. Nothing, however wonderful, which happens according to natural law, would be considered by any one as supernatural. The law, in obedience to which a wonderful thing happens, may not be known; but this would not give it a supernatural character, so long as we assuredly believe that it did happen according to some law. *Hence it would appear to follow that a man thoroughly possessed of the idea of natural law as universal, never could admit anything to be supernatural,** because on seeing any fact, however new, marvellous, or incomprehensible, he would escape into the conclusion that it was the result of some natural law of which he had before been ignorant."

Again:—

"What difficulty in this view remains in the idea of the supernatural? Is it any other than the difficulty in believing in the existence of a supreme will,—in a living God? If this be the belief, of which M. Guizot speaks when he says that it is essential to religion, then his proposition is unquestionably true" (p. 22).

"To believe in the existence of miracles, we must believe in the superhuman and in the supernatural. But both these are familiar facts in Nature. We must believe, also, in a supreme will and a supreme intelligence; but this, our own wills and our own intelligence, not only enable us to conceive of, but compel us to recognise, in the whole laws and economy of Nature. Her whole aspect answers intelligently to our intelligence,—mind responding to mind as in a glass. Once admit that there is a Being who,—irrespective of any theory as to the relation in which the laws of Nature stand to His will,—has at least an infinite knowledge of those laws, and an infinite power of putting them to use, then miracles lose every element of inconceivability. In respect to the greatest and highest of all,—that restoration of the breath of life, which is not more mysterious than its original gift,—there is no answer to the question which Paul asks, 'Why should it be thought a thing incredible by you that God should raise the dead?'"

Why, indeed? if God *be* God, according to the view of St. Paul, Ὁ *μακάριος καὶ μόνος δυνάστης*, the blessed and *only* Potentate; but, if hampered by laws of nature, of which He has only an infinite knowledge and an infinite power of putting them to use, I should not see (were I an agnostic) whence the men of faith derived the certainty of their opinion. God must surely be supposed to have an infinite knowledge of the ways of man and an infinite power of putting them to use; but we recognise in every repetition of the Lord's Prayer that His will is *not* already done on earth as it is in heaven.

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* The italics are mine.

I entirely agree with the following summing up of the argument in the first chapter of the *Reign of Law*:[*]—

> "*Nature is the great Parable*,[†] and the truths which she holds within her are veiled, but not dismembered. The pretended separation between that which lies within Nature and that which lies beyond Nature is a *dismemberment of the truth*. Let those who find it difficult to believe in anything which is above the natural, and those who insist on that belief, first determine how far the natural extends. Perhaps in going round these marches they will find themselves meeting upon common ground. For, indeed, long before we have searched out all that the natural includes, there will remain little in the so-called supernatural which can seem hard of acceptance or belief,—nothing which is not rather essential to our undertanding of this otherwise unintelligible world."

Let us, then, consider a little more closely this expression, the laws of Nature, and seek to discover what it means and what it does not mean. We all act with absolute certainty on the understanding of the immutability of these "laws" as far as we know them to exist; but, nevertheless, do not profess to understand them, inasmuch as our knowledge is imperfect. For example, if Mr. Crookes shows us, on good evidence, a *fourth state of matter* (Reynolds, p. 398), of which we had previously no conception, we count it but sound sense to receive such rectification, as this discovery makes needful, of our previous conceptions on the subject.

Do we understand by "law" a power acting *ab extra*, as the wind moving the trees; or a power acting from within and *inherent in matter?* In the relations of atoms amongst themselves, as displayed in chemistry, and consequently in the constitution of the Universe, we surely must admit the latter as the true interpretation. It is much more the Ἔρος and Ἀντερος (attraction and repulsion) of the Greek philosopher than the reign of law of the noble Duke.

> "First," says Hesiod,[‡] "there was Chaos, then came Ge, Tartarus, and *Eros*, the fairest among the gods, who rules over the minds and councils of gods and men."

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[*] People's Edition (pp. 4, 23, 54).

[†] The italics are mine.

[‡] Hesiod lived about 400 years before Herodotus, or 850 B.C. "He derived his knowledge from the ancient schools of priests and bards, which had their seats in Thrace and Pieria, and thence spread into Bœotia, where they probably formed the elements out of which the Hesiodic poetry was developed."—See Smith's *Dictionary, in loco.*

It was from this quarter (Thrace) that the Druids derived their knowledge.—See my *Druids and their Religion* (pages 33, 47, 48).

> "Eros was one of the fundamental causes in the formation of the world, inasmuch as he was the uniting power of love, which brought order and harmony among the conflicting elements of which Chaos consisted."

III.—*The Laws or Conditions of Being.*

Let us investigate further the laws of being. Not unfrequently the chemist, availing himself of the mathematical certainties of the laws of combination, forms a new body. He knows, we will suppose, of a combination of A+B, and also of A+3B. Then he reasons thus, that if A could be induced to combine with 2B, he would have something new, and he succeeds in obtaining the desired result. It may be said that this is perhaps, after all, not a new substance, since it may have existed before, though not known. But there are other cases in which it can be demonstrated that the substance cannot possibly have ever existed before. As soon as it is produced, however, it is found to have a *law* of its being; quite *sui generis*, presenting, perhaps, most important effects for good or for evil on the animal economy, or fraught with important advantages in the arts of life.

How, then, did this law of its being originate? Certainly not *from without* (unless so far as we understand that all things are from God), and if we say *from within*, we touch upon questions insoluble by human intellect.

Was the promise and potency of all the new properties, which from henceforth will inhere in the new substance, attached *provisionally* to some four or five atoms,—say of carbon, oxygen, nitrogen, and hydrogen,—in addition to an almost infinite number of properties attached to other combinations of the same atoms? Or were the properties freshly bestowed by the Creator?

Perhaps the most intelligible proposition may be that the "nature" of each combination is fixed from the number and the arrangement of the atoms composing each molecule. This seems to lie at the foundation of the doctrine ascribed to Pythagoras:—

> "We find running through the Pythagorean system the idea that order or harmony of relation is the regulating principle of the whole universe." *

I suppose that no one would commit himself to maintain any of these theories. What, then, remains? It is so because it is its nature! Chloral will send you to sleep; but if you take too strong a dose, the law of your nature is that you succumb to the nature of its influence.

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* Smith's *Dictionary, sub voce*, "Pythagoras."

An Italian ecclesiastic,[*] who abandoned the Christian religion and afterwards, as a professor at Milan, had considerable influence for evil, clothed his *no faith* in the following expressive terms, well adapted to the somewhat Machiavellian shrewdness of his countrymen.

> "The world is what it is, and it is *because it is;* any other reason whatever of its essence and of its existence can be nothing but a sophism or an illusion."[†]

Mr. Reynolds seems to me to lose himself sometimes in the vain attempt to conciliate scientists by adopting from them theories of *Becoming* and of *Being*, inimical to faith, and of which Science herself is beginning to be ashamed.

I take, as an illustration, the following sentence :—

> "This connexion of all visible things with the invisible, and of *germs* that are *possibly not organised* in the *sense* of *being eggs*, possibly in themselves *dead* as the *inanimate matter* and *putrefiable substances* out of which they *creep* as *living things*, is evidence, amounting to scientific proof (!), that there is a continual going forth from the unseen to the seen; evermore an awakening of *life* from the *dead*, which, whether called *evolution* or *creation*, renders the universe a sort of *enchanted valley;* and adds a strange unlooked-for confirmation to expectation that the *forms* which *matter* assumes are *not its real substance*,—not essentials, but accidents. Whether any piece of matter shall take the shape of solid or liquid or gas, seems a question of temperature and pressure. Who can tell the fixed and unvarying elemental form of matter? *Has it any such form?* Is it a *mere condition of energy or force in loco?* Ought we to regard it as *endowed with the faculty of assuming every variety of shape* according to the mere accidents of environment? Truly the world we live in is one of marvels; and if we regard it as *a manifestation of the Divine Being*, the mysteries are analogous to those of the written revelation profound, and *as to essence inscrutable*" (p. 5).

This passage ought to have been pronounced *ex cathedrâ*, to an admiring audience.

As it is found *in a book* written for the benefit of the agnostic, I must confess that I read it with extreme surprise. I thought that I was an interested and deeply-sympathising spectator of a duel between a champion of the faith and an agnostic, and here I behold my man lost in a fog and exposed to a mortal thrust without apparently being at all aware of his danger.

> "Indignor, quandoque bonus dormitat Homerus.
> Verum opere in longo fas est obrepere somnum."[‡]

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[*] Known under the pseudonym of Franchi.

[†] *The Heavenly Father*, by Ernest Naville (p. 158).

[‡] Horace, *De Arte Poetica*, ed. 1741.

It is not given to many authors to keep either themselves or their readers awake through a work of five hundred pages. It is really a comfort to find that in the course of a little time our author is himself again. Instead of that most damaging criticism which those who have heard Huxley or Tyndall discoursing on the properties of matter would know how to append to those portions which I have underlined, I prefer that the author should himself give the *coup de grâce* to his own "double" when he figures as *a man of pseudo-science* :—

> "To assert self-existence is the denial of causation, and when we deny causation we also deny commencement. We must add to the absolute impossibility of conceiving this, the fact that we have to endow matter with all the powers of mind, and give to that which is *dead* all the properties of *life*, making matter to all intents and purposes God. Doing this we fall into the old heathen homage of Nature and worship Power, the phenomenal God. To worship Power only, Dr. Arnold said, is devil-worship" (p. 44).

In the next page but one Mr. Reynolds expresses his belief that,—

> "The integration of all natural forces into a single agency,—one grand entity, God,—is the grandest conception of humanity, the profoundest of scientific truths" (p. 46).

This, I suppose, looks at the matter from a scientific standpoint, and is not quite satisfactory; because it does not ascribe the knowledge of God entirely to His revelation of Himself, but rather to a conception of humanity.

Another close-lying sentence is better :—

> "The production of matter out of nothing is the real mystery; but as we are not only obliged to assume some cause, but also a first cause, or we cannot speak of causation, we say,—'*All things are of God.*'"

Here the agnostic interposes that this explanation is a *petitio principii*. How do we know this? Our answer can only be that we have a revelation from God Himself; which, on most certain ground of evidence, we commend to his acceptance.

This revelation informs us that no man hath seen God at any time: the only-begotten Son, which is in the bosom of the Father, He hath declared Him.

And what, then, is the declaration?

God is Spirit (*Πνεῦμα ὁ Θεός*), and they that worship Him must worship him in spirit and in truth.

This announcement sweeps away all pantheism, and all man-worship and devil-worship. It shows the nature of God to be absolutely separate from, although the originator of, that of every creature. He alone is SPIRIT, inhabiting eternity, dwelling in the light which no man can approach unto, before whom angels veil their faces. The angels are *spirits:* they are never spoken of as co-equal with God; far less is man, who, though endowed with a spiritual nature, in which he can be rendered capable of communion with God, is never called *spirit,* and only under certain conditions is spoken of as *spiritual.* His fall from God has rendered him sensual, carnal, and, with all his powerful intellect, incapable, till renewed, of communion with God.

There can be no compromise. Either the above is true, or "Matter alone is eternal and divine,"*—by *matter* understanding all those forces which are either inherent in or immanent on what we roughly call the *materia* of the universe.

IV.—*The Cause of all Being.*

We need not be ashamed of our knowledge of God. It is God-given, and not the result of our own superior faculties, nor of the "genius" of Moses, nor of "the gradual growth of the universal mind of humanity," as asserted by some philosophers. Hence there is a Divine certainty about it which we cannot impart to the agnostic, but which we cannot and ought not to conceal.

And here we arrive at the real *substance* of the universe,—that which "*stands under*" all its manifestations. That is God Himself, the "I am that I am," as revealed to Moses.

Having thus established the *Causa causans,*† I am not ashamed to confess immense ignorance in very many cases as to the *causa causata.* Why may we not be permitted to enjoy the luxury of saying, I do not know?

It is, at all events, a *real* luxury to turn from attempted explanations of laws of nature and from eloquent periods in public addresses, which probably do not even satisfy the intellect of the preacher himself, and refresh ourselves with the grand and simple language of the Psalms and the Old Testament generally; where we see everywhere the omnipresent Jehovah; or in the New, where we behold the Son of God upholding all things by the word of His power.

V.—*Organised Nature.*

He, "binding Nature fast in Fate,
Left free the human will."

Pope's *Universal Prayer.*

I have thus far been considering only matter in its in-organised state,—*dead matter*, as it is sometimes called,* which, nevertheless, we behold by the aid of science instinct with marvellous endowments and with never-ceasing activities; indestructible apparently, though ever changing in its manifestations, not losing its own peculiar nature when subjected for a time to the vital force, nor coalescing with life; but, when life has departed, returning to its old chemical affinities; evermore displaying the glory of God to those who can skill to trace the mathematical precision of all the infinitely varied forms and combinations in which it presents itself to the mind of the student of Nature.

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* Page 35, quoted by the author.

† See Boyle's *Free Inquiry*, quoted in Johnson's *Dictionary*, *sub voce.* "Nature."

But, till we have organization, we never find the adaptation of all the parts to the good of the whole. Still less do we discover *that* which, at first indistinctly indicated in the vegetable creation, manifests itself in the very lowest forms of animal life, and even in those creations which seem to pass from one kingdom (as we used to say) to the other in the course of their brief lives.

I refer to the individual WILL of the mere sac of living matter that, as the *amœba*, knows how to enclose its prey at its pleasure, for the satisfaction of its appetite; or as a *vibrio* can direct its free motions not without aim of its own. For each creature has its own free will.

When we look at the world of organized existence, we find that every living thing has its own individuality, and is endowed with a property of first developing that individuality out of an embryo at first shapeless and formless, and then of maintaining that individuality and even of reproducing parts that are accidentally rendered defective, as the lobster reproduces its claws according to the *type*. Some such explanation must be given to what physicians call the *vis medicatrix naturæ*.

Moreover, each creature has the power of reproduction of its own image; sometimes the formative idea passing through even three or four intermediate types in which it could not be recognised, but the chrysalis produces in its perfection the special butterfly to which the perfect realisation of the type tends from the beginning.

Nature is creative and upholding, not by any inherent power of its own, but by the will and power of the Supreme, who acts in and through his creatures, for *in Him* we live, and move, and have our being. Take away the Unseen and the Supernatural, and all would resolve itself into chaos.

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* I object to the term *dead* matter as entirely unscientific and misleading. "Deprived of life" is the first meaning given to the word "dead" in the English Dictionary I turn to, but "matter" has never been "*deprived of life.*"

By no effort of ours could we force a single atom to combine otherwise than in accord with its *nature.* It is otherwise with *organized nature.* In this realm we are permitted to be to a certain extent *creators,* in so far that many of the most useful plants, and fruits, and grains are not exactly such as they are given to us by nature, but modified by art. Scientists have overcome the repugnance which God has implanted in animals to union with divergent types, and produced thus some monstrous results, of which the so-called *Leporides* (half rabbit half hare) were a short-lived example.* In all these artificial variations, however, there is wanting that fixity of organization which belongs to the primitive type. This is shown by the continual tendency to relapse into the wild or natural state.

Every creature has its nature, and rejoices in the perfectness of that nature. The personal will and identity of the bird is as manifest as in that of the man; God having so decreed that each life that he has given should be in its measure a reflection of his own ever-blessed existence.

The following anecdote illustrates my meaning. The writer† is relating how he had undertaken to make an artificial dove which was to sustain itself in the air by means of an ingenious mechanism :—

> "I had wrought unceasingly at its construction for more than three months. The day was come for the trial. I placed it on the edge of a table, after having carefully closed the doors, in order to keep the discovery secret, and to give my friend a pleasing surprise. A thread held the mechanism motionless. Who can conceive the palpitations of my heart, and the agonies of my self-love, when I brought the scissors near to cut the fatal bond ? Zest ! the spring of the dove starts, and begins to unroll itself with a noise. I lift my eyes to see the bird pass, but after making a few turns over and over, it falls, and goes to hide itself under the table. Rosine, my dog, who was sleeping there, moves ruefully away. Rosine, who never sees a chicken, or a pigeon, without attacking and pursuing it, did not deign even to look at my dove, which was floundering on the floor. This gave the finishing stroke to my self-esteem. I went to take an airing on the ramparts. I was walking up and down, sad and out of spirits, as one always is after a great hope disappointed, when, raising my eyes, I perceived a flight of cranes passing over my head. I stopped to have a good look at them. They were advancing in triangular order, like the English column at the battle of Fontenoy. I saw them traverse the sky from cloud to cloud. Ah ! how well they fly, said I to myself. With what assurance they seem to glide along the viewless path which they follow. Shall I confess it ? Alas ! may I be forgiven ! The horrible feeling of envy for once, once only, entered my

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* See Dr. Lucas, *Hérédité Naturelle.* T. ii., 201.

† Zavier de Maistre, quoted by E. Naville, Lecture iv., 1863, Geneva.

heart, and it was for the cranes. For a long time afterwards, motionless, in the midst of the crowd which was moving around me, I kept observing the rapid movement of the swallows, and I was astonished to see them suspended in the air, just as if I had never seen that phenomenon. A feeling of profound admiration, unknown to me till then, lighted up my soul. I seemed to myself to be looking on Nature for the first time. I heard with surprise the buzzing of the flies, the song of the birds, and that mysterious and confused noise of the living creation which involuntarily celebrates its author. Ineffable concert, to which man alone has the sublime privilege of adding the accents of gratitude! Who is the Author of this brilliant mechanism? I exclaimed in the transport which animated me. Who is it that, opening his creative hand, let fly the first swallow into the air? It is He who gave commandment to these trees to come forth from the grounds, and to lift their branches towards the sky."

De Maistre thus found out the difference between a God-created universe and a self-created mechanical world, between *existences* and *machines.*

Haeckel (Reynolds, p. 104) tells us:—"Life is nothing but a connected chain of very complicated material phenomena of motion."

Who does not see that if our amusing author had been endowed with skill and power to *complete the chain,* he would still not have formed a *bird,* but only an *automaton.* However perfect such *automata* might be, they could not be conscious of their own happy existence, nor have such instinct to guide their flight as called forth his admiration. "Doth the hawk fly by *thy wisdom,* and stretch her wings towards the south?" (Job xxxix. 26.)

I am conscious of a hearty desire to know more on the subject, and find in Mr. Reynolds many passages of elaborate description of what is already known. Far from any wish to settle down in superstitious ignorance, I ask to know more; for all will but declare *more of the glory of God.* Only let the knowledge be *real.*

I am unable to lend myself to that facile acceptance of plausible inanities, which is so common, that even Professor Huxley (Reynolds, p. 15) says:—

> "The army of liberal thought is, at present, in loose order, and many a spirited freethinker makes use of his freedom merely to vent nonsense. We should be the better for a vigorous and watchful enemy to hammer us into cohesion and discipline; and I for one lament that the bench of bishops cannot show a man of the calibre of Butler of the *Analogy,* who, if he were alive, would make short work of the current *à priori* infidelity."

This eminent Professor begins to see that the superstitious adherence of the followers of evolutionist theories to their chiefs, is a real hindrance to the progress of science. He has good sense enough to know (also) that our ignorance is greater than we willingly confess.

VI.—*Animated Nature.*

What, then, is the *nature* of the animal creation? In how far is the essential identity of each creature fixed? In how far liable to inherent change? In how far modified by circumstances? Is there any such thing as species, or is all nature in a continual flux, the sport of chance? Or are the creatures, man included, all improving themselves (excepting those myriads of types which are *improved off* creation), and all tending towards perfection?

I may venture to say that we are not yet prepared with answers to these and many other questions. May I add that our knowledge of inanimate nature in chemistry is much more *demonstrably* perfect than that of animated nature.

We do not *know* what is *natural.* How, then, can we distinguish what is *supernatural?*

The following comes to hand whilst I am writing, as an appropriate illustration of my meaning:—

"INTELLIGENCE IN ANIMALS.—Some years ago my father, who was a medical practitioner in Somersetshire, had a valuable horse, which eventually he was obliged to part with, as it was vicious, and not always safe to drive. During the time my father drove it, he had occasion to visit daily for several weeks an old gentleman who had met with a serious accident. His patient lived at the bottom of a steep lane, which branched off at right angles from the main road. This horse was always used for visiting this patient, and during the first two or three weeks, when there were dangerous symptoms, was frequently driven down the lane twice a day.

"The farmer to whom my father sold this horse lived at a distance of several miles beyond this turning on the same road, attended regularly the market in the town where my father lived, and necessarily passed this sharp turning both going and returning therefrom. Some three or four years after purchasing this horse, he had occasion to drive into the town to fetch my father to attend his wife. As the case was urgent, he got into the gig, and was driven by the farmer towards the farm where he lived. Suddenly, without the slightest warning, the horse turned down the lane he knew so well, nearly capsizing them.

"As soon as they had recovered themselves, the farmer exclaimed that 'he had never known the horse do such a thing before all the years he had had it.' My father was surprised, and said, 'Not when you have driven this way to and from the market?' The farmer replied, 'That the horse never even so much as looked at the turning, whilst he had driven it until now.' 'Well,' said my father, 'he must associate me, knowing that I am in this gig, with the many visits he used to pay with me down that lane, when I attended my poor old patient at the bottom, after his accident. I patted his nose before starting, and he knows by my voice that I am behind him. His memory has served him well, and he concluded that I must be going the same journey we performed together so many years ago.' My father always considered this fact evidence of reasoning powers in the horse, and although I incline to the same opinion, I will not comment upon it, but content myself with simply relating this anecdote. *Nov.* 19, 1881."—A. H., in *Knowledge.*

This is all *natural,* and such facts could be multiplied indefinitely. They surely show, in so far, *a kindred nature in man and animals,*—a kinship which is finely brought out by Burns in his address to a field-mouse,—his "poor, earth-born companion and fellow-mortal,"—applied, moreover (in the true spirit of poetry) to an instructive end :—

> "Still thou art blest compared wi' me,
> The present only toucheth thee ;
> But, och ! I backward cast my e'e
> On prospects drear !
> An' forward, tho' I canna see,
> I guess an' fear ! "

The next anecdote immediately following in the same periodical conducts us still further :—

> "A singular instance of *apparent* prescience in a dog occurs in an account given Nov. 21 of a father shot by his son. Here is the evidence of the wife and mother :—
>
> "'We heard nothing to disturb us after retiring to bed until about half-past two o'clock next morning. About that time a little dog which belonged to my husband, and was a great favourite, came upstairs, and jumped upon our bed. My husband tried to make the dog go away, but he could not do so, as the little thing seemed so "fussy." At last he thought the best thing to do would be to take the dog downstairs, and, by shutting the door at the bottom, prevent it from returning. My husband got out of bed, and took the dog in his arms for the purpose of carrying it away. In about half a minute, and when he was on the stairs, I heard a loud report, as if a pistol or a revolver was being fired. This was repeated twice, and the deceased then shouted out at the top of his voice, "I am shot !"'
>
> "The peculiarity here is that the coming danger, of which the animal appeared cognisant, could only have been imparted by the footsteps or other movements of *a member of the family ;* this, under ordinary circumstances, could have given no such premonitions of danger to the dog. Has any similar case been observed ? "

Is this *supernatural* or is it not ?

I have been myself compelled to yield to invincible repugnance of a horse to pass a place which *he remembered* as an Aceldama, or "place of shedding blood."* This aversion belonged, I suppose, to his *nature ;* but if so, the nature of a horse partakes of greater *sensitiveness* than that of man.

I now proceed to consider a case of the *evidently supernatural* class. It is that of the ass of Balaam, whose mouth, it is said, "the Lord opened." I will not attempt to show that some undiscovered law of nature might exist, of which advantage was taken to give the rebellious prophet a lesson. Such reconciliations of Scripture and science seem to be generally feeble in conception, and when completed (for the most part) more difficult to receive than the simple narrative itself. I admit at once that the whole was above nature, and not only so, but *contrary to nature,* but claim that my opponent should make this admission, that what is impossible with man is possible with God.

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* An old slaughter-house.

Having obtained (if only for argument's sake) the admission that the narrative is *true,* look how entirely *natural* the whole seems; though admitting us into a region of which we know nothing till our eyes are opened,—namely, that of the ministration of angels in the Providence of God.

Could anything be imagined more truly *natural,* if only a supernatural Power be admitted to have been exerted to give new *faculties* to the brute to express those *feelings* which may well be present to the nature of an animal under ill-treatment even now? Do we not see the like feelings expressed in the intelligent eye of the dog, in the tears of the deer?

Probably some latent powers, of what have been often considered the supernatural sort, are inherent in the nature of man. A clerical acquaintance related to me, how, in a perfectly natural way, he acquired the power of soothing nervous pain in others. I had happily no occasion to test his powers.

The following is of a different kind. "In the life of Lord Chief Justice Holt, a curious anecdote is recorded. It appears that, when a young man, Holt happened, on one occasion, with some companions, to stop at an inn in the country, where they contracted a debt of such amount that they were unable to defray it. In this dilemma they appealed to Holt to get them out of the scrape. Holt observed that the innkeeper's daughter looked remarkably ill, and was told by her father she had an ague. Hereupon he gathered several plants, and mixed them together with a great deal of ceremony, afterwards wrapping them in a piece of parchment, upon which he had scrawled certain letters and marks. The ball thus prepared he hung about the young woman's neck, and the ague did not return. After this the never-failing doctor offered to discharge the bill, but the gratitude of the landlord refused any such thing, and Holt and his companions departed. When he became Lord Chief Justice, a woman was brought before him accused of being a witch. *She was the last person ever tried in England for witchcraft.* She made no other defence than that she was in possession of a certain ball which infallibly cured ague. The ball was handed up to the Judge, who untied it, and found it to be the identical ball which he had made in his youthful days for the purpose of curing the woman's ague and paying his own bill."[*]

Many things are natural which might not be thought so at first sight. I have known a man cured of ague by the usual remedies, but, suffering from a relapse into all the symptoms brought on by a shock to the nervous system.

I cannot dwell upon the nature of man,—tripartite, as I think it is,—*body, soul,* and *spirit;* a view in which Mr. Reynolds appears to agree (see page 154), further than to say that this certainly appears to be the doctrine of Scripture, in which I am happy to be able to agree, whilst acknowledging my dissidence not only from the painful nonsense,—of thought being connected with molecular changes in the brain,—but also from the notion that the action of the spirit in man is necessarily dependent on the bodily organs at all. When sight is withdrawn the sense of touch has become so exalted that a botanist could still distinguish plants by contact with the thin skin of the lip, aided by the tongue; colours also have been in the same manner distinguished; and in a recent case which excited much attention in the medical world each sense as it was withdrawn seemed supplemented by some other.[†]

All this is *natural,* but what are we to say to those cases in which the spirit when departing from the body makes itself known to those at a distance by impressions on the organs of sight or sound.[‡] I should have thought it incredible, or at all events superhuman, that I should be able to converse with a friend at some miles distance with *more* ease than across my own table (if that friend be a little deaf); yet so it is, in these days of the telephone, and we all know there is nothing supernatural about it.

From the teaching of Christ we must be led to understand that "all things are possible to him that believeth," and that many things, not only superhuman, but supernatural, may be natural to *the new man.* So St. Peter, that disciple whom we all feel so entirely one in nature and in all natural frailty with ourselves, walks on the waves, and even raises the dead,—of course, not without the special assistance of Divine power.

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[*] Quoted from the *Penny Magazine* for 1835.

[†] See a paper on the "Transference of Special Sense" in the *Journal of Psychological Medicine and Mental Pathology,* vol. vii., pt. i., p. 37; also *Biography of Mrs. Croad,* Bristol.

[‡] The widely-published event connected with the lamented death of George Smith, B. A. Soc., will serve as one instance.

VII.—*The Meaning of Nature.*

According to our Revelation, the Universe is represented as the wondrously wrought and splendid *robe* of the Almighty, such as the kings were accustomed to array themselves with when they sat down on their thrones of royal majesty. All creation is represented as the handiwork of God, and as having for its primary object His own pleasure. Heaven records this as a worthy object. "The four-and-twenty elders fall down before Him that sat on the throne, and worship Him that liveth for ever and ever, and cast their crowns before the throne, saying, 'Thou art worthy, O Lord, to receive glory and honour and power: for Thou hast created all things, and for Thy pleasure they are and were created.'"

Rebel spirits and rebel man may *object*, but all must admit that the statement gives a logical explanation of the meaning of Nature. All is represented as made by the *Λόγος*, the Word who was in the beginning with God, and from this wondrous source the archetypal ideas must have arisen,—the thoughts of that mighty Mind, if we may so speak reverently, clothing themselves with objective reality. Hence the distinctness of type. Everything is brought forth by the earth and waters "after its kind." Jehovah Elohim made every plant of the field before it was in the earth, and every herb of the field before it grew (Genesis i., ii.). The (pseudo) Zoroaster, and the Platonists in general, had the same conception, traditional apparently, and not derived from our Revelation. The Father is represented as "understanding by mature counsel ideas of every form; these spring forth to sight flowing out of one fountain. For the Almighty Ruler set before the world an imperishable intellectual pattern (*νοερὸν τύπον ἄφθιτον*) or original model, the print of whose form was made to appear through the world, which hence is beautiful with all kinds of ideas (*παντοίαις ἰδέαις*) of which there is one fountain."

This, according to Cory, is Sabæan Philosophy in a Greek dress, and if so, it must, according to Dr. Chwolson, reach far back in the world's history into the dim ages of the past, when Abram was brought into conflict with these sectaries, who boasted of deriving their religion from Seth.

If all invented by the Greek mind (however), this notion of embodied divine ideas will stand advantageous comparison with the notions of our scientists. If there is no determination on the part of the Almighty Ruler to preserve these types, what reason can be assigned for the unspeakable disgust at the violation of those certain boundaries which he will not have overpast?—Whence the world-wide conviction that in the lion we have a type of majesty and strength, in the peacock of pride, in the ape a satire on humanity, in the bee-hive the image of a well-ordered state, and so forth throughout creation?

Admirably did the Greek mind catch hold of these conceptions. Nature, they said, gave certain means of offence and defence to all creatures, but when it came to the creation of woman, she had nothing left. What then did she give her? *Beauty!* and beauty overcomes strength.

I know not how this may be, but without leaving my own belongings, I see how Nature arranges her parable. I have a strong, well-trimmed, quickset hedge, which, of course, I like to see uniform; but, alas! what has happened? I see it in parts decaying, *dead.* I have just been obliged to dig up portions and replace; a remedy which, perhaps, will, after all, fail. For in searching after the cause, I call to mind that beautiful bindweed which in summer covered with its luxuriant foliage the hedge where it rested, and adorned in seeming thankfulness with its white flowers of the chastest purity the crabbed couch on which it rested so languidly. I remembered that it had in some way insinuated itself amongst the roots, depriving the supporting hedge of some part of its nourishment, and then with gently insinuating embrace binding itself ever more strongly round the branches of the thorn. The convolvulus has conquered here, I say,—beauty has triumphed over strength.

Whence, we may ask, come these *destroyers,* which I am ready to think comprise one-half of animated creation? How beautiful many of them are! how perfect in their creation! Look at the tiger of the East, and consider his ravages amongst the population; and, again, the serpents of the same district. Of what fierce delight in life the genus *Felis* gives us instances; how they rejoice to lick the warm blood! Our common cat—what a perfect creature she is in her well-knit limbs, and what ingenious cruelty she displays in tormenting her victims!

Will our utilitarian opponents inform us what is the meaning of all this, or why the destroyers of the Saurian epoch have, after all, been compelled to give way to the comparative tranquillity of the present? Will beauty and grace have the victory in the end?

In page 103 (Reynolds) I read as follows:—

> "Have the living particles which are arranged into the shape of an organism an *innate tendency* to arrange themselves into the shape of that very organism to which they belong? This is a hard thing to say, *though the tendency to assume the specific form must be inherent in all parts of the organism.*"

Mr. Reynolds searches vainly for an intelligible answer to this question, which conducts us to the very confines of our knowledge, and shows us how wonderful is the constitution of Nature. This is well stated by Dr. Lionel S. Beale, F.R.S., who has instructed us more in the mystery of life than any other author :—

> "In living centres, far more central than the centre as seen by the highest magnifying powers, in centres of living matter where the eye cannot penetrate, but towards which the understanding may tend, proceed changes of the nature which the most advanced physicists and chemists fail to afford us the faintest conception."

This is real science and real philosophy, and shows that we do not fully comprehend Nature in her most common modes of action, and therefore, no wonder that we have no proper words to describe the mystery hidden behind the above centres. But our wise men who deny all God-given knowledge have no difficulty in forging explanations.

Listen to the following (quoted at p. 109, Reynolds*) :—

> "So that when a man, translating the formula, says 'the joining of stuff into a lump, then the equal unjoining and sending out of movement from it, the making stuff pass from a no sort of unstickingness into some sort of holding-togetherness, while the movement not sent out undergoes a like change from no sort of keeping-togetherness into some sort of sticking.'"

Haeckel tells us, "Life is nothing but a connected chain of very complicated material phenomena of motion. These motions must be considered as changes in the position and combination of the molecules" (p. 104).

And Haeckel is a consistent Materialist and the prince of all Evolutionists ; so that having failed to reach any water in pumping at this dry well, I am not so much disappointed in coming back to our author's own explication :—

> "We are driven to the conclusion that, complex as are chemical units, physiological or life units are more complex ; that difference of composition in these units themselves, leading to differences in the mutual play of energies, causes the endless varieties of existing forms" (p. 104).

I must be pardoned for saying that we do *not* understand these varieties nor what constitutes the individuality of any living thing? What makes the beech-tree which I see before me a beech-tree rather than an oak? And why, when we have succeeded so far in putting force upon this individuality as to constitute the fern-leaved variety, do individual branches sometimes revert to the old hereditary type, as I have seen on more than one occasion?

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* Being our author's rendering in English of the sentence he quotes from H. Spencer's *First Principles* (p. 396). This piece of "plausible inanity," as quoted by Reynolds, is as follows :—

"It is an integration of matter and concomitant dissipation of motion, during which the matter passes from an indefinite, incoherent homogeneity, to a definite, coherent heterogeneity, and during which the retained motion undergoes a parallel transformation."

It must be a very strong "sort of *holding-togetherness*" which keeps the type DOG the same in all the fifty or sixty varieties which man has either found or formed, and which makes it impossible for the type *dog* to mingle with the type *fox;* the latter having an eye adapted to the twilight, the nocturnal *idea* cannot harmonise with the *diurnal.* The same in pigeons, flexible as is the pigeon nature; whilst the admirable goose refuses to be mystified and remains *goose* still. But what shall we say to the *Lingula,* which gives its name to the Lingula flags of Wales, and of which Murchison says, "The genus has, indeed, lived on from the Silurian or primæval days to the present time, though its former associates, the graptolites and trilobites, vanished long ago from the world."*

This primæval inhabitant of Wales has refused to mingle its nature or to change its type for an incalculable period of time. We are here, confessedly, within a measurable distance of the beginning of animal life.

The creatures, according to Genesis, were formed at different periods. According to the testimony of the rocks we must come to the same conclusion. For do we not judge of the relative age of different deposits by the organic remains which they enclose?

All honour to the Lingula! but what shall we say about its strong individuality of nature? What caused this *sticking-togetherness* of its type? At all events, this bivalve† has continued from the very earliest beginning,—a witness against the truth of evolution. For why should this type remain fixed, and the others develop themselves, even up to man? The geological record is, in this case, *too complete* for the evolutionists.

It is correct science now to deny all individuality to trees, and, of course, I assent to the opinion of those who *know*, *i.e.*, of "scientists"; moreover, I see that this individuality can be multiplied into as many individualities as you can succeed in growing by cuttings from the plant. But how am I to understand this fact, that each part is fitted to subserve the purpose of the whole? If there were not the ascending and descending axis the notion of *tree* could not exist. If all were root, there would be no upward growth. If there were no ascending sap, how would the trunk or branches be formed? If there were no leaves, how could there be any increase?

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* Murchison's *Siluria: the History of the oldest-known Rocks containing Organic Remains*" (pp. 40, 41).

† In order to secure correctness, I wrote to my friend W. Carruthers, F.R.S., V.P.L.S., F.G.S., as first-rate authority. He replied, "The reference to the *Lingula* is quite correct. It would be more correct to call it a *brachiopod* than a *bivalve,* for though it has two valves, the name "bivalve" does not generally include the *brachiopoda.*"

How wonderful the hydraulic machinery which pumps up, filtering at the same time the fluid constituents, distributing them to every extremity. How marvellous the chemistry of the leaves and the aërial adaptation of the stomata. To say that all these things come by chance, or by *such chance* as is no *chance* at all, viz., "natural selection," is an insult to one's understanding.

Mr. Reynolds well says:—

> "It is absolutely and for ever inconceivable that carbon, hydrogen, and nitrogen, should be otherwise than indifferent as to their position and motion, past, present, or future. Are we, 'the cunningest of Nature's clocks,' to believe that there is no intelligence at the heart of things? Are we to set our time as if it were more philosophical to regard unconscious, unintelligent, energies, as wise creators and intelligent guides, than to have faith in God? We will not thus sell ourselves for nought" (p. 122).

Still more remarkable are the means by which the plant succeeds in supplying its needs, sometimes by what we may call legitimate means, sometimes at the expense of its neighbours. The roots prolong themselves in search of water, or attracted, as it might almost seem, by some marvellous instinct in following up the scent of their appropriate nourishment.

A writer in the *Gardener's Chronicle* (Jan. 18th, 1873) says:—

> "I had some horse-radish growing near a pump, and in taking some up to-day, I found a root had grown 9 feet in length down the well." The editor remarks, "A 9-feet run in search of a suitable larder must be a rare feat, even for a horse-radish root."

It almost revolts against our moral sense to watch the contrivances seen in the pitcher-plants for betraying their prey and securing for themselves a supply of animal food; to attribute these to the plants themselves would be to endow them with a high degree indeed of wisdom and intelligence; but what shall we say of their selfishness? That it is emblematic? The modest-looking and unpretending sundew (*Drosera*) not only entraps, but, I think, poisons her victims.

The apparently voluntary motions of the twining plants, and the thickening and strengthening of the coil when adhesion is secured, also hold out to us striking exhibitions of creative skill. Indeed, the world is full of wonders of which the explanation is wanting, if the supernatural is ignored.

The leaves seem to enjoy the light of the sun, and certainly the delicate leaves of some tropical plants bend their surfaces so as they may best catch its rays. This tendency has been attributed also to some flowers, and is immortalised by the poet:—

> "The heart that has truly loved never forgets,
> But as truly loves on to the close,
> As the sunflower turns on her god when he sets
> The same look which she turn'd when he rose."

It is quite possible that our "Scientists," who delight in destroying the poetry of nature, may succeed in finding some mechanical reason for this; but I think they cannot so explain the remedial expedients that we next notice.

For instance, the gale in October last broke in half a large elm of mine, and I then discovered that the upper portion, which seemed sound and flourishing, had been living, like a young spendthrift, at the expense of its decaying parent. The middle portion, from some injury, had fallen into decay, and the top had actually sent down adventitious roots, some almost as thick as my finger, to feed upon the rotten portion, making their way between the bark and the wood for 15 feet or 20 feet.*

These adventitious roots present, in the tropical plants, strange vagaries. A plant of *Vanilla* in my hot-house flourishes by their means, and has sent down long roots into the soil on the opposite side of the house, though the original stem has quite withered away.

It is a matter full of interest to behold the sensitive plant fold and droop its leaves in regular succession as the shock is communicated from one part of the plant to another.

We watch something which is quite beyond our present powers of explanation; for we do not imagine for a moment that the plant has any nervous system through which feeling could be communicated: nevertheless, in the marvellous adaptation of things which we call Nature, we have before us an instance of the typical unity impressed on the creatures. There is a sort of feeling after the endowment of a higher order of creation. It is a perilous ascent, however, and if the plant really had sense it might have been shown in divesting itself of the capacity of suffering!

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* Compare my *Contrast between Crystallisation and Life*, p. 28 (the woodcut). Second edition.

If it be said there *is* no capacity for suffering, which I freely grant, then of what advantage to the plant can this *appearance* of shrinking sensibility really be?

I do not think we can arrive at an explanation without the above conception of *typical unity*. If nature be the manifestation of the glory of God, and if it all is, as the Duke of Argyll asserts, a *Parable* for our instruction, why should we not learn lessons of instruction from the sensitive plant as well as from the lilies of the field?

And the lily. Why was the lily made so beautiful, specially the lily of Palestine,—"the beautiful Hûleh lily, the flower, as I believe, mentioned by our Lord in that delightful exhortation to trust in the kind care of our Heavenly Father:—'Consider the lilies, how they grow: they toil not, they spin not; and yet I say unto you that Solomon in all his glory was not arrayed like one of these.' This lily is very large, and the three inner petals meet above and form a gorgeous canopy, such as art never approached and king never sat under, even in his utmost glory"?*

Again, I ask, why was it made so beautiful? "You are mistaken," says the Agnostic, "it made itself beautiful in order to attract attention." Then, it seems, vegetable *vanity* met with its reward; for the gazelles delight to feed upon them, so that they are safest among the thorns. "You can scarcely ride through the woods north of Tabor, where these lilies abound, without frightening them from their flowery pasture."

Our Lord walked the earth with his eyes ever open to the poetry of nature. He comprehended at one glance, not the outward only, but the inner or supernatural side. The effect of this is shown in His inimitable teaching. Never man spake like this man. He knew how from man's surroundings to raise and to elevate the character of man. He could give His disciples power to tread on serpents and on scorpions, and over all the power of the enemy.† Nature has its dark as well as its flowery side. He taught us truly how to look through nature up to nature's God. I am tempted to transgress the limits of my paper, and say something about the disseverance of education from religion, but I forbear; only this I will say, that all the great achievements of the mind of man, whether in letters or art, whether in poetry or painting, have been ennobled and in a certain sense directed by that view of nature which gives us to see it as a wondrous book spread out for our instruction,—a parable full of meaning inspired by the mind of its Author.

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* Thompson, *The Land and the Book*, p. 256.

† Luke x. 19.

In the very formation of language, if we believe our revelation, we find that the mind of man was drawn out by the Creator in connexion with the study of His works (Gen. ii.). But how great is our ignorance, even yet, of Nature! According to the Chinese, the formation of writing began with the veryillustrious Fou-hé, whose virtue united heaven and earth. He lifted up his eyes on high and saw figures (*wên*) from which he gained instruction, and he lowered them to the earth, and beheld models to imitate on the earth.

He then invented writing according to six rules, the first of which was to *design the form.*

The characters for sun and moon belong to this form, and it is by figuring the form or the body of the sun and moon that they were represented in ancient writing (*Kou-wên*).*

Afterwards follow figurative and curious metaphorical and other resemblances. Such, in its substance, must also have been the origin of the Egyptian hieroglyphics.

But if the world had been formed by a caucus of utilitarian philosophers, with drab for its colouring and uniformitarianism for its rule, where would have been its teaching? We cannot picture to ourselves a Positivist writing Shakspeare, still less could we believe in a government of Agnostics having sound principles of statesmanship. Not knowing God in nature and in Providence, they neither can know their own nature nor that of other men. "The negation of God" is a worm at the root of all beneficial legislation.

May England be preserved from, and France be delivered from, such guidance!

CONCLUSION.

I shall have failed in my special object in this paper if I do not carry the conviction of my readers with me that the nature of the Agnostic,—his idiosyncracy, if you will,—must be studied by those physicians who would bring health to his soul. It is a very familiar observation that a man convinced against his will is not converted after all. Even an animal may be driven to a flowing well of purest water, but cannot be compelled to drink. We all of us partake of one nature; in some tending more to the *Agnostic,* in others more to the *superstitious* side; but to one and all, the manner of God's dealing with us is this,—"The *goodness* of God leadeth thee to *repentance.*"

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* *Essai sur l'Origine et la Formation similaire des Ecritures figuratives Chinoises et Egyptiennes*, (p. 9). Pautier, Paris.

We could not easily find a treatise more suited for use of some of these than the Book of Job. In it we find a sorely-tried and tempted man taking very much the same ground which they occupy,—speaking grievous things against God, and longing that his Adversary had written a book to answer him. This, however, the One with whom he contends does not do, but gives the tempted one instead *the knowledge of Himself,* and *this* effects what the well-intentioned speeches of his friends failed to accomplish.

Even the inspired speeches of Elihu were as powerless as are our papers at the Institute to effect a reconciliation between Nature and Grace.

I may be pardoned, then, for saying that Mr. Reynolds does not satisfy my mind as to what is really "The Supernatural in Nature"; that the Duke of Argyll does not clear away all difficulties; and that other instructors of the people, whom it would be invidious to particularise, lead us astray into the midst of a thorny labyrinth.

I present this paper, not as a dogmatic essay, but as tending to elicit thought and discussion on the subjects treated. It would be a good work done by the Institute to give us certain definitions of the words *Nature, Natural,* and *Supernatural.* So far I search for these without success.

The work of Mr. Reynolds I have ventured to criticise in a friendly spirit, and it will have been seen that I think it is one highly interesting to those who agree with the author; but his "verification by *free use of science*" has led him into errors which I have attempted to point out for the benefit of others who may be inclined to pursue the same adventurous path.

A discussion of a general character took place upon the paper (which was read before being finally arranged), in which Mr. Enmore Jones, the Rev. J. Fisher, D.D., Mr. W. Griffith, Mr. G. Wise, and the Chairman, took part. The following communication was also read from the Rev. Canon Saumarez Smith, Principal of St. Aidan's Theological College, Birkenhead:—

4*th March*, 1882.

* * Mr. Howard's paper is interesting and suggestive, and will doubtless "tend to elicit thought and discussion."

One leading idea which underlies a good deal of what Mr. Howard says is the too often neglected axiom of all philosophical argumentation, viz., that *Faith is a necessary instrument of true Science.* For "science," in its completest sense, includes "metaphysics" as well as "physics"; the psychologist's reflective and introspective work, as well as the physicist's observational and inductive work; the problems of the "ethical," in addition to those of the "material," sphere of investigation.

Faith postulates the *supra-* (or *super-*) natural, as the starting-point of knowledge. "In the beginning, God."

And study and experience confirm the reasonableness of this postulate, For "physical" phenomena lead up to an acknowledged *mystery*, wherein force and motion have their hidden source. "Laws of nature" (so far as discoverable by man) still point to a region beyond (*supra*) and above (*super*) human observation. Mental analysis indicates the supremacy of will and intelligence over mere matter. Moral emotions irresistibly suggest the ideas of a righteous supreme power, and of human responsibility and dependence.

All these conclusions confirm both a union and an antithesis between the *natural* world (*i.e.*, the Kosmos as man can know and deal with it) and the *supra-natural* (*i.e.*, the unknown regions beyond the reach of man's "natural" observation).

A belief in *causa causans* is unquestionably reasonable, and a belief in this "cause" as personal and eternal can be shown, both by intuitive and logical considerations, to be well grounded.

But does not Mr. Howard in his paper somewhat ignore the extent to which men's reasoning and moral faculties may be employed in the investigation of the "supernatural," apart from Scriptural revelation? May we not, should we not, do something besides commending the Bible to the acceptance of the "Agnostic" (§ IV.)? May we not, *e.g.* (in order to prepare the way for that acceptance), argue in behalf of philosophic "dualism" *versus* (the now fashionable) "monism," and show that the scientist who attempts by a "double aspect" theory (*i.e.*, by the theory that all things may be looked upon "objectively" and "subjectively," but that mind and matter are not essentially distinct) to evade the plain and insurmountable distinction between mind and matter, is unscientific?

Mr. Howard states that the fall of man has rendered men "sensual, carnal, and with all his powerful intellect incapable, till renewed, of communion with God" (end of § III.).

To what extent can this incapability be predicated?

On the last page but one he says "the mind of man was drawn out by the Creator in connexion with the study of his works" (Gen. ii.). Does he mean us to infer that, after the fall, *all* such education of men's mental faculties was rendered impossible?

I put these questions, not, of course, in opposition to Mr. Howard's advocacy of the *Biblical* revelation being the most necessary and the most suitable for men, but in order to suggest that *philosophical* reasoning, honestly and candidly pursued, may in some cases, perhaps, prove a bridge over which the Agnostic may pass from his region of negation or hesitation as to the "supernatural," into that province of reasonable faith where the believer finds "natural science" to be an outer court within which is a Holier Place, and an inner Shrine, where the glory of the "supernatural" I AM shines upon each humble worshipper, harmonising the "spiritual" with the "natural," and making things temporal a pathway to the apperception and enjoyment of things eternal.

In the "philosophical reasoning," however, to which I have alluded, the Biblical records (apart from acknowledgment of religious authority assigned to them) should have their due weight, and not be ignored as a considerable factor in the problem handled by the philosophizer.

We, as Christian believers, arguing with sceptical opponents, who profess to be scientific and philosophical, must insist upon *all the facts* of human nature and history being taken into account, before a man pretends to say, either that there is nothing supernatural, or that the supernatural is entirely unknowable.

The Author in replying to the foregoing writes :—

I think Canon Saumarez Smith's letter most valuable and important, and that it expresses my "underlying ideas" with much more perspicuity and in better language than I could command.

As regards the question whether we ought not to "do something besides commending the Bible to the acceptance of the agnostic," the writer misunderstands me. My real views are these :—

In the discourse of "the beloved Paul" (as Luther calls him) to the wisdom-seeking Greeks at Athens, I find this Apostle following out to the fullest extent the plan of availing himself of the amount of knowledge already possessed by his auditors ; whilst he corrects their errors, by irresistible reasonings founded on propositions of natural religion admitted by both parties. This sermon is to me full of the most practical instruction and the deepest philosophy. No doubt our missionaries often follow this example, for instance, in dealing with the Chinese mind. But in the compass of the address *there is no reference to the Scriptures*, of which we must suppose the Athenians to have been wholly ignorant.

But as an Apostle he bears testimony to *one fact*, to which he claims not only their attention, but if I may so speak, their submission as to a pledge* which God has set before the mind † of all men, of the full accomplishment of the work of his Son, and his consequent purposes toward mankind.

He does not leave them in the possession *merely* of improved natural religion, but instructs them in Christian truth.

After all, his success at Athens was limited to a small number of converts, and the rest of his hearers were unaffected. Not many wise men were *chosen*. It needs something to stir more profoundly the depths of the being of man, than the mere correction of his intellectual errors. If I may say so, the polarity of the human spirit must be reversed.

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* *πίστις*, an assurance, pledge of good faith ; a means of persuasion. See Greek Lex., Liddell and Scott, ii., 1, 2.

† *παρίστημι*, see as above.

Luther says, that whilst he lived a holy and blameless monk, his feelings toward God were those of hatred. "I secretly and in earnest felt incensed against Him."

It scarcely needs to read between the lines of autobiographies of agnostics (one celebrated name occurs to me) to see that this is the real state of things which has to be set right; and which is set right (in a few such cases as at Athens), by testimony rather to the Word of God made flesh than to the word of God printed, except as far as the latter is an instrument in leading to the knowledge of the former.

Canon Smith inquires, "to what extent can the incapability of *communion* with God be predicated?"

To this, I answer that *apprehension* of God is one thing, *communion* with God is another. I believe in the existence of *agnosticism*, but I do not, as at present informed, believe in that of *atheism*. The devils believe and tremble—the atheist believes and hates.*

The reversed attitude of the spirit—the reversed polarity—is beautifully shown in Heb. xi. He that cometh to God must believe that He exists, and that He becomes a rewarder of those that diligently seek Him. I suppose this to be a truth applicable to all time.

This being presupposed, the education of men's faculties is not only rendered possible, but is the subject of direct scriptural teaching. Did not Linnæus take for his motto, "the works of the Lord are great, sought out of all them that have pleasure therein." My attention was early directed by my father to a passage in perhaps the earliest book in the Bible, where Elihu commends to the attention of Job "the balancing of the clouds, the wondrous works of Him that is perfect in knowledge." It would be strange that I should disparage science, when I remember that the author of the "Essay on the Modifications of Clouds"† (in which he attached the current names to the different shapes manifest in this *world of study*) delighted in teaching *me* what he knew of *electricity*, and watched with the feeling of a devout Christian its changeful effects as there displayed for our admiration.

With the last sentences of the letter I most entirely concur. I am surprised that our instructors do not more frequently adopt the course indicated, and grasp with firmness this many-headed and variously-named *nettle*, from whose poisonous touch so many are suffering.

My sympathies go with every effort to uproot it altogether; but we must remember that the roots strike very deep, and that the task is not an easy one. I must, however, again thank Canon Saumarez Smith for his contribution of many valuable thoughts, tending towards this much to be desired result.

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* See *Recollections of William Hone, thirty years an atheist, afterwards a happy Christian*, lately published.

† By my Father, Luke Howard, F.R.S. (first published in 1803).

ORDINARY MEETING, January 2, 1882.

The Rev. R. Thornton, D.D., V.P., in the Chair.

The minutes of the last meeting were read and confirmed, and the following elections were announced :—

Member :—Rev. J. W. Ayre, M.A., London.

Associates :—Rev. M. Eells, M.A. (Pacific Univ.), United States; Rev. J. B. Brown, B.A., Blackburn; Rev. G. B. Durrant, India; Rev. W. Windsor, India; Joseph Hassell, Esq., A.C.K., London; Rev. J. White, M.A., T.C.D., Hon. M.A. Magdalen Coll., Oxford, London; T. Watson Vessey, Esq., Bristol; Hon. H. Phillips, U. S. Commissioner, Philadelphia; Miss A. Giberne, Eastbourne.

Also the presentation of the following works for the library :—

"Proceedings of the Royal Society."	*From the same.*
"Transactions of the Soc. of Bib. Archæology."	*Ditto.*
"Catalogue of the Free Library, Sydney, N.S.W."	*Ditto.*
"La Defense des Colonies." Professor Barrande.	*Ditto.*
"Workman's Hall Messenger for 1881."	*Ditto.*

The paper read at this meeting is not inserted here, as a question has arisen in regard to it.

ORDINARY MEETING, April 3, 1882.

H. Cadman Jones, Esq., in the Chair.

The minutes of the last meeting were read and confirmed, and the following elections were announced :—

Members :—Lady Alicia Blackwood, Boxmoor ; J. M. Head, Esq., Reigate.

Also the presentation for the library of the following works :—

"Proceedings of the Perthshire Society of Natural Science." *From the same.*
"Translation of Epistle to the Hebrews." By J. E. Howard, F.R.S. *Ditto.*

The following paper was then read by the author :—

MATERIALISM. By C. W. Richmond, one of the Judges of the Supreme Court of New Zealand.

MATERIALISM is a system of thought which regards the universe, including man and the mind of man, as solely consisting of or produced by matter, or what is called "material force." The importance of such a doctrine cannot be over-estimated, since it apparently implies disbelief in the existence of God and in the moral freedom of man. God disappears in this system of thought as a needless hypothesis, whilst man is reduced to a mere effect of the powers of nature. Such, at least, appear to me the logical results of the doctrine.

Yet it is certain that Materialism has been the philosophic creed of men, both in ancient and in modern times, whose aspirations were lofty, and whose lives were temperate, laborious, and serene; and to some of its professors it has seemed to be consistent, not only with a high morality, but even, strange to say, with strong religious feeling. A lively sense of the inadequacy of Materialism as a theory of the universe, and of its present mischievous tendencies, need not interfere with our appreciation of it as a necessary and often useful element in the historical development of philosophical opinion, and of science and the practical arts.

The great achievements of our time in the field of physical research, and more especially the brilliant induction connected with the name of Darwin, have, without doubt, largely contributed to the revival in the latter half of this century of materialistic habits of thought. What is called scientific explanation has penetrated to groups of phenomena hitherto enveloped in a mysterious darkness, more particularly in the department now called "Biology," which concerns itself with the development, structure, and functions of living organisms. Darwin's data are few, seemingly simple, and, for the most part, well established on the solid basis of experience; so that one is apt to forget that he postulates any force of which the origin is unknown. We learn how the eye has been developed from mere spots of pigment, and the honey-bee educated by circumstance to attain the perfect symmetry of her hexagonal cells; how monkeys have obtained prehensile tails and giraffes have been provided, in the same organ, with special fly-flappers; why the orchid *Coryanthes* entraps the humble-bee, visiting its gigantic flowers, to a plunge-bath in its great water-bucket; why the argus pheasant and peacock spread such glorious fans whilst their hens are soberly attired; why the glow-worm carries a light in her tail; how the torpedo came by his galvanic battery; with an endless list of like "whys" and "hows": we read and are delighted,—almost spell-bound; not only by the variety of nature, but by the force and ingenuity of the human mind; and are prone to believe that the plummet of science has really touched bottom! and that the origin *of all things* in mere physical adjustments is at last on the point of demonstration!

Persons unused to philosophical inquiry may not be aware that the question of original causation is not even approached by the physical researches to which I have alluded. To many such it seems simple to say,—We take our stand upon experience; we believe what we know; we know what we can see, hear, touch, taste, smell. To us the world seems to go of itself. If any one will explain the origin of things without going beyond the limits of what we perceive through the senses, to him we will listen as proposing a possible and a rational solution. No solution which transcends these limits, and resorts to the super-sensuous, is admissible.

But, by the general consent of both the great divisions of modern philosophy, compliance with this demand is an impossibility. Those who are determined to ascend to the first cause of things may, if they please, call themselves Materialists, but must needs transcend the limits of sensuous experience. Nature presents our outward senses with nothing more than a succession of appearances,—phenomena. Suppose a line of billiard-balls, and let the outermost be struck by another ball impelled by some unseen hand: the motion will be transmitted from ball to ball in regular succession until the force is spent by friction. No one would think, in such a case, of attributing the motion of any one ball to its immediate predecessor in the line of movement. It is plain that the balls are mere vehicles of force, and not originant causes. They are, as regards their movement, but links in a chain of effects, where each indeed stands in the relation of a cause to those that follow, but is at the same time the mere effect of all that precede. Physical nature presents to our senses precisely such a chain of successive effects, the originant cause of which is hidden from us. To the philosophic eye the world does not seem to go of itself. True, the phenomena follow one another in an invariable order. But unless we go behind phenomena, unless we carry our thought back to the unseen power,—I myself should say to the unseen hand,—which first set the machine in motion, and still keeps it moving, we learn nothing more than the order of events. "We only find," as Hume asserts, "that the one does actually in fact follow the other. This is the whole that appears to the outward senses. The scenes of the universe are continually shifting, and one object follows another in uninterrupted succession; but the power or force which actuates the whole machine is entirely concealed from us, and never discovers itself in any of the sensible qualities of body. In reality there is no part of nature that does ever by its sensible qualities discover any power or energy, or give us ground to imagine that it could produce anything, or be followed by any other object which we could denominate its effect."*

This is just one of the points on which the first impression of nearly every one will be against the doctrine of the philosophers; yet, if you will ponder the matter, remembering always that the question is as to what we know *by means of the outward senses*, you will, I think, be sure to agree in the end that Hume is in the right. When, indeed, experience has taught us that any natural occurrence has been invariably followed by some other, then, assuming as we all do in modern times the perfect uniformity of nature, we confidently expect that the appearance of the former event, whenever it occurs, will be infallibly followed by its regular consequence; and in common speech we couple the two together as cause and effect; though, if we reflect upon the matter, we easily perceive that the so-called cause is itself a mere effect of something antecedent. We must not delude ourselves with the metaphor of a self-acting machine, for, in truth, there is no such thing. No machine goes of itself, or is more than an arrangement for transmitting force,—like the intermediate billiard-balls. We may, then, take it as established, that the notion of producing cause or force is not given us by the senses, nor to be found in external nature, for this is the concurrent verdict of all the schools of modern philosophy. On this account, Hume and his followers, including Mill and Herbert Spencer, consistently maintain that the knowledge of a producing cause is beyond the scope of science. Knowledge of the order of phenomena is all that, in their opinion, is possible to the human intellect.

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* Hume, *Essays*, No. VII., "Of the Idea of Necessary Connexion."

But, despite the caveats of these philosophers, the dynamic idea, the notion of a force in nature, maintains its hold upon the human mind. We are impelled by an irresistible necessity to demand a cause of every occurrence. May I quote Martineau as saying, "By an irresistible law of thought all phenomena present themselves to us as the expression of power, and refer us to a causal ground whence they issue. This dynamic source [this origin of power] we neither see, nor hear, nor feel; it is given in *thought*,—supplied by the spontaneous activity of the mind itself as the correlative prefix to [*i.e.*, inseparably coupled in the mind with] the phenomenon observed. By the general acknowledgment of philosophers this idea is so strictly a necessary idea as to be entirely irremovable from the conception of any change: to cut the tie between them, and think of phenomena as *not effects*, is impossible, in fact, even to the very writers who propose it in theory." A productive power, though unrevealed to sense, must, then, be sought for behind the things produced. To revert to our well-worn illustration,—the movement of the first billiard-ball must be accounted for, or nothing is finally explained.

In one respect the backward search for the primal cause of all things has, of late, been made easier for the Materialist, and a guess of ancient science has been confirmed. Modern experiment has taught us that the various effects ascribed to the supposed forces of matter are mutually interchangeable; that force, arrested in one manifestation and seemingly absorbed, is not destroyed, but transmuted. The old fable of Proteus, as has been often said, is exactly realised in nature as she appears to the eye of modern science. Bind her you cannot, for she forthwith reappears in a new shape. The motion of the smith's hammer, arrested by the anvil, sets the atoms vibrating and is changed to heat; whilst heat in the furnace of the steam-engine results in molar motion. An electric current can be made to produce magnetism, and *vice versâ* magnetism to give rise to the phenomena of electricity. The galvanic current is an effect (in the physical sense) of chemical changes, and is also (in the same sense) a cause of them. Heat, electricity, radiant energy, and chemical action, are mutually convertible, can all produce motion, and be, in turn, produced by it. More than this, there is reason to conjecture that the effects of force, differing as they do in their action on ourselves as sentient subjects, may be identical when considered in their own nature, or, as we say, *objectively;* and that all are resolvable into modes of motion. Such an objective identity with motion is considered to be already established in regard to light and heat. Motion appears the simplest effect of force, and everything points to the probable resolution of all other phases or effects of force into this one mode of manifestation. That accomplished, physical science will have verified the datum of Democritus. We shall have matter in motion, in void space, as the apparent beginning of physical things. There the science of nature must come to a stand; the investigation of phenomena can take us no further back. But behind the ultimate phenomenon of motion the materialist assumes a force as causing motion, and through motion, in its successive phases, producing all other phenomena. This force is supposed to reside in atoms, the ultimate particles of matter. In modes yet to be explained it leads on to combinations of ever-increasing complexity, and is displayed in higher and higher developments of power; rising from mechanical to chemical, from chemical to vital, from vital to mental manifestations. Without diminution or increase, by imperceptible gradations, it ascends through the infinite series of physical existence,— from the glowing hydrogen and nitrogen of the incandescent nebula to the light of reason in the brain of man. Such is the theory we have to deal with.

It will be seen that the Materialist herein agrees with the Theist,—that he asserts, and, so to speak, believes in, a First

Cause; differing in this from Hume and the Phenomenists: for the scepticism of Hume is as fatal to Materialism as to Theism. But the first cause of the Materialist is mechanic force, or matter endued merely with mechanic force, and wanting not only mind and consciousness, but sensation, and even life. Yet this dead matter, or, if you please, this mindless unconscious power, is the supposed origin of life, sentiency, and self-conscious intellect. What we have to consider is, whether this be a thing conceivable.

It is implied in the very notion of an originating cause that it shall be adequate to the production of its appropriate effect. No words can make this matter clearer. But here you will, of course, bear in mind the distinction between cause in the proper sense, and in the sense of mere physical antecedent. In regard to the latter, there is no necessary resemblance between it and the natural occurrence of which experience has shown it to be the invariable precursor, although in familiar language the two things are, as we have seen, coupled together as cause and effect. For example, there is nothing in the qualities of oxygen and hydrogen that could *à priori* lead one to suppose that the result of their combination could be a substance like water, which differs in every sensible quality from either of its natural predecessors or parents. In the physical antecedent we cannot, as Hume rightly teaches, by mere dint of thought and reasoning, discern the presence of any power or quality adequate to the production of any effect at all, far less to the production of any particular effect. And when we recur, as we must recur, to the super-sensuous, or metaphysical, notion of cause, we are at the same time carried back by reason behind all the phenomena of nature to some real energy in which they all originate, and by which they are maintained. When, therefore, I insist that the cause must appear to the mind adequate to the production of its appropriate effect, it is of this *vera causa*, this true originating power, that I am speaking. But the proposition is one not capable of proof, for it relates to a simple primary idea, of which no analysis is possible. I can only throw myself upon the general consciousness of mankind, and beg you to ask yourselves whether it is not as I say.

Now, the Materialist assumes, as we have seen, that he has at his disposal a force self-capable of the wonderful series of transmutations which has been enumerated. The series includes as its last two terms the ascending steps, first, to vital, and thence to mental, manifestations. Let us fix attention on the last step but one,—that, namely, from inorganic matter to living organisms. Observation has, it is true, as yet failed to discover any case in which even the lowest organism appears to have been generated out of inorganic matter. Let it, however, be assumed that such a sequence of phenomena,—no more, remember, than a sequence of phenomena,—may be at last recognised as sometimes occurring, or as having at some time occurred in the course of nature,—there will still remain at this upward step a huge difficulty for the Materialist. Beginning, as he must, with separate atoms endued with motion, and this motion resulting in attractions, repulsions, and mutual affinities, he has with these, when we arrive at animated nature, to build up *an organic whole.* Now, an organic whole is not the mere sum total of the constituent atoms. These, as we all know, are in perpetual flux in every living creature. "The parallel," says Huxley, "between a whirlpool in a stream and a living being, which has been often drawn, is as just as it is striking. The whirlpool is permanent, but the particles of water which constitute it are incessantly changing. Those which enter it on the one side are whirled around, and temporarily constitute a part of its individuality; and as they leave on the other side their places are made good by new comers."* The turmoil of molecules in a living creature may, he thinks, be justly likened to the great wave of the vortex below Niagara, which for centuries past has maintained the same general form, though the component particles of water are changing every moment (*The Crayfish,* p. 84). One might almost think that Samuel Taylor Coleridge was speaking, and with Coleridge I continue :—"As the column of blue smoke from a cottage chimney in the breathless summer noon, or the steadfast-seeming cloud on the edge point of a hill in the driving air-current, which, momently condensed and recomposed, is the common phantom of a thousand successors,—such is the flesh which our bodily eyes transmit to us, which our hands touch. Not only," he proceeds, the "characteristic shape is evolved from the invisible central power, but the material mass itself is acquired by assimilation. The germinal power of the plant transmutes the fixed air and the elementary base of water into grass or leaves, and on these the organific principle in the ox or the elephant exercises an alchemy still more stupendous. As the unseen agency weaves its magic eddies, the foliage becomes indifferently the bone and its marrow, the pulpy brain or the solid ivory. That what you see *is* blood, *is* flesh, is itself the work, or, shall I say, the translucence of the invisible energy, which soon surrenders or abandons them to inferior powers (for there is no pause, no chasm in the activities of nature), which repeat a similar metamorphosis according to *their* kind. These are not fancies, conjectures, or even hypotheses, but *facts*, to deny which is impossible, not to reflect on which is ignominious." *

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* Huxley, *The Crayfish.* Kegan Paul & Co., London, 1880.

We see, then, that an organic whole imports a distinct and individualised agency, whereof the identity consists not in the ever-changing material, but in the living principle, which on that changing material imposes a definite form. The profound and candid Lange clearly recognises the difficulty which here arises for the materialistic thinker:—"Sensation," he says, "is found only in the organic animal body, and here belongs, not to the parts in themselves, but to the whole. We have thus reached the point where Materialism, however consistently it may be developed in other respects, always either more or less avowedly leaves its own sphere. Obviously with the union into a whole, a new *metaphysical* principle has been introduced, that by the side of the atoms and void space appears as a sufficiently original supplement. . . . . The organic whole is, then, a wholly new principle by the side of the atoms and the void, though it may not be so recognised." †

This leads on to what appears to me an insuperable objection. Atoms in motion, and, of course, a void space to move in, are, it will be remembered, the postulate of the Materialist. Sensibility for the atoms is not demanded. If it were, other considerations would be opened, to which I shall hereafter advert. Given, therefore, the non-sentient atoms, how is the sentient to be developed out of the non-sentient? I again refer to Lange, who thus pursues the subject of my last extract. "The difficulty," he says (*id.*, p. 146), "which here again suggests itself of fixing the exact seat of sensation is the most important point, completely evaded by the Epicurean system, and, in spite of the immense progress of physiology, the Materialism of the last century found itself at precisely the same point. The individual atoms do not feel or [if they did] their feelings could not be fused together, since void space, which has no substratum, cannot conduct sensation, and still less partake of it. We must, therefore, constantly fall back on the solution,—the motion of the atoms is sensation." But he asks, a few lines further on,—"How can the motion of a body in itself non-sentient be sensation? *Who* is it, then, that feels? How does the sensation come about? Where?"

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* Coleridge, *Aids to Reflection*, p. 392. Pickering, London, 1836.
† *History of Materialism*, vol. i., p. 144. Trübner & Co., London, 1879.

With these last words of Lange, the full difficulty of the problem opens upon us. Mere animal sentiency may perhaps exist without any degree of consciousness, as, for example, in the oyster. But the philosophy which would explain the Kosmos as the effect of the forces of matter must show those forces to be adequate causes of conscious sensation in man. Here, however, on the confession of men themselves strongly attached to atomic Materialism as a physical theory, we reach the brink of an impassable chasm. "On the atomic theory," writes Lange (*id.*, 23), "we explain to-day the laws of sound, of light, of heat, of chemical and physical changes in things, in the widest sense, and yet atomism is as little able to-day, as in the time of Democritus, to explain even the simplest sensation of sound, light, heat, taste, and so on. In all the advances of science, in all the modifications of the notion of atoms, this chasm has remained unnarrowed." Even when science shall have succeeded in constructing a complete theory of the functions of the brain, and in showing clearly the mechanical motions, with their origin and their result, which correspond to sensation, she will be (I again recur to the words of Lange) "for ever precluded from finding a bridge between what the simplest sound is, as the sensation of a subject,—mine, for instance,—and the processes of disintegration in the brain which science must assume in order to explain this particular sensation of sound as a fact in the objective world" (Lange, *id.*, p. 23). To the same purpose Professor Tyndall, who, on this point, will not be a suspected authority, says, in his article entitled "Virchow and Evolution" (*Nineteenth Century*, November, 1878),—"Here, however, the methods pursued in mechanical science come to an end; and, if asked to deduce from the physical interaction of the brain molecules the least of the phenomena of sensation or thought, we must acknowledge our helplessness. Between molecular mechanics and consciousness is interposed a fissure [the Professor is thinking of the Alpine glaciers] over which the ladder of physical reasoning is incompetent to carry us."

But, if no mechanical theory of the universe can account for mere sentiency, how complete must be the failure of every such system to take the last upward step from vital to mental, and to resolve the problems of human thought and feeling. "The special case of those processes we call intellectual," says Lange, "must be explained from the universal laws of all motion, or we have no explanation at all. The weak point of all Materialism lies just in this, that with this explanation it stops short at the very point where the highest problems of philosophy begin" (*id.*, p. 30). Man himself is, so far as our experience extends, the highest product of the universe. Is it rational,—is it possible,—to regard him as the effect of something destitute itself of mind and consciousness? Can the effect be more and greater than the originating cause? It may, indeed, be less, but can it, I repeat, be greater? Just in this point lies the vast advantage of those who, in any form, hold to the doctrine of an originating mind. On either side an assumption simply stupendous,—for the moment let me call it an assumption,—must be made when we endeavour to account for this stupendous universe, of which we form a part. Some one, perhaps, will interject, But why endeavour to account for it? The question is foreign to our immediate purpose; but I reply, in passing, because we cannot help attempting. The problem of existence is thrust upon us. *We are*, and know there was a time when we were not. We know ourselves to be the effects of an unknown power. Not to suppose a cause is simply a thing impossible. Some cause of all things,—that which I just now called "an assumption,"—is, then, no assumption, but a belief, which is inevitable. The belief of the Theist is in a Being not less than man, but immeasurably greater, who of the fulness of his life has given us a portion. The first cause of the Materialist is matter in motion,—nothing more,—and I ask again is such a cause of things conceivably adequate to the production of the known effects? Can we so explain to ourselves our own rational existence? We have seen materialistic explanation brought to a stand before the phenomenon of mere organic life. How can it deal with the fact of conscious personal existence? Have I, then, no meaning when I say, I AM? Let us ask ourselves that question, for it is in vain to argue with those who will not face it. Then, are we, in deference to supposed deductions from physical experience, to give the lie to that inner consciousness which tells us that we are other than, and more than, the material organism to which our life is for the time inexplicably bound; that the *mind* of man is not his *brain*, nor his life, the sum of the mere vital forces which are its perishable instruments? Can we, indeed, believe that saint and sage, philosopher and poet; the play of fancy, the method of reason, the struggles of the Will, the warnings of the Conscience, with all that belongs to the abysmal deeps of Personality; all the drama of history; all the passion of life; are, as this pseudo-science pretends to teach us, the mere outcome and expression of molecular change, all products alike of the fortuitous concourse of atoms? Rather let us confess an ineffable mystery, than thus darken counsel by words without knowledge!

The notion of a self-transforming power, which becomes of itself at each upward movement more than itself, is no solution of the riddle of the world. Each successive change requires a cause. Under the term "development" we only conceal the difficulty, for that which is developed must have pre-existed potentially in the germ. Out of matter we can get nothing which hypothesis has not first put into it; and, if mind be the outcome and effect, nothing less than mind will suffice as the cause and origin. It may be argued that the creative ascent to man is by an infinite gradation extending downwards and backwards into past Time through æons of lower existence. But this does not diminish the requisite creative power. It is not as in mechanics, where the smallest force, with time to work in, may suffice to the mightiest tasks. For it is here a question, not of quantity, but of quality. "In not a few of the progressionists," says an authority already quoted, "the weak illusion is unmistakable, that, with time enough, you may get everything out of next to nothing. Grant us,—they seem to say,—any tiniest granule of power, so close upon zero that it is not worth begrudging; allow it some trifling tendency to infinitesimal increment; and we will show you how this little stock became the Kosmos without ever taking a step worth thinking of, much less constituting, a case for design. The argument is a mere appeal to an incompetency in the human imagination, in virtue of which magnitudes evading conception are treated as out of existence, and an aggregate of inappreciable increments is simultaneously equated,—in its cause to *nothing,* in its effect to *the whole of things*. You manifestly want the same causality, whether concentrated on a moment, or distributed through incalculable ages; only, in drawing upon it, a logical theft is more easily committed piecemeal than wholesale. Surely it is a mean device for a philosopher thus to crib causation by hair-breadths, to put it out at compound interest through all time, and then disown the debt. And it is vain after all; for, dilute the intensity and change the form as you will of the power that has issued the universe, it remains, except to your subjective illusion, nothing less than infinite and nothing lower than divine."

Fairly viewed, the facts import that at every step in the ascent there has been a fresh influx of power, a gradual imparting of new qualities. We may grant to the physicists that the stock of mere physical force has been a constant quantity. But it is rational to hold that its persistence has been accompanied by gradual infusion of transforming power and purpose, of which physics can take no account, and to do the tasks of which material force has been, as it were, set as a bond-slave.

Still, however, there will recur the old question, How are we to explain the apparent dependence of mental phenomena upon material arrangements? A single clot of blood upon the brain will destroy consciousness. And how shall we account for the phenomena of insanity, and of old age, unless we regard the mind as an effect of the material organism? Is it not true, as the German says, "Without phosphorus no thought?" The argumentative force of these questions depends upon the fallacy of which Hume has furnished the refutation already quoted. Philosophy does not justify us in asserting that the concomitant phenomena of mental and cerebral action are related to one another as cause and effect. They are to be regarded as conjugate effects of an unknown cause which has coupled them together, perhaps only for a time. To say that consciousness and thought are *produced* by the motion of the molecule of the brain is to outstep the limits of physical science, and, more than that, to state a proposition which is absolutely inconceivable. To use the language of Professor Tyndall, "it eludes all mental presentation." Vibrations of matter cannot be conceived of as translated into thoughts and feelings. This would be to cross the unbridgeable chasm between mind and matter. And there is this additional reason for not regarding the mental as products of the accompanying material phenomena. The molecular changes in the substance of the living brain result in the generation of nervous force. The physical series of events is complete in itself, without reference to the synchronous mental series. The energy developed in the brain is, no doubt, a physical force. As such it can be fully accounted for. It disappears in the performance of its appropriate physical work, including not only those material phenomena (whatever they may be) which accompany thought, but digestion, secretion, respiration, muscular action; in short, in the provision of the main supply of power for every vital process. We have every reason from analogy to believe that the dynamic account of expenditure and product could be made out, and exactly balanced, were our physiological knowledge equal to the task. But in such an account it would not be possible to place "thought" to credit as a product of expended force. The account would balance without it. "That metaphysical ghost the Ego" (it is Huxley's phrase) suddenly looks in on the completed calculation of the physicist, as an unwelcome visitant from some strange region, refusing to be accounted for, or to be explained away. The mental power developed simultaneously with molecular changes in the brain is, therefore, not a phasis of the material energy developed. It cannot be computed in foot-pounds. "Consciousness on this view," says Tyndall, in the article already cited, "is a kind of by-product, inexpressible in terms of force and motion, and unessential to the molecular changes going on in the brain." Except the term "by-product," which implies causal connexion, we may accept this statement. A little further on in the same paper Tyndall quotes himself as inquiring, "What is the causal connexion between molecular motions and states of consciousness?" "My answer," he continues, "is, I do not see the connexion, nor am I acquainted with anybody who does." It is no explanation to say that the objective and subjective are two sides of one and the same phenomenon. Why should the phenomenon have two sides? This is the very core of the difficulty. There are plenty of molecular motions which do not exhibit this two-sidedness. Does water think or feel when it runs into frost-ferns upon a window pane? If not, why should the molecular motion of the brain be yoked to this mysterious companion—consciousness? We can form a coherent picture of all the purely physical processes,—the stirring of the brain, the thrilling of the nerves, the discharging of the muscles, and all the subsequent motions of the organism. We are here dealing with mechanical problems, which are mentally presentable. But we can form no picture of the process whereby consciousness emerges, either as a necessary link, or as an accidental by-product, of this series of actions. The reverse process of the production of motion by consciousness is equally unpresentable to the mind. We are here, in fact, on the boundary line of the intellect, where the ordinary canons of science fail to extricate us from difficulty.

It is a favourite saying of the ultra school of Materialists that the brain secretes thought as the liver secretes bile. In the light of the foregoing observations we may perceive the full absurdity of such a statement, as of others of the like coinage. Such language has no real significance, except, indeed, as displaying that the speaker who employs it has failed to grasp the facts of the case. Our conclusion, then, is that the association of the human mind with a physical organism is not ground on which the philosopher is warranted in regarding mind as the mere effluence and expression of material changes.

As I have quoted largely from Professor Tyndall, it is as well to say, that whilst glad of him as a useful ally in what he calls "laying bare the central difficulty of the Materialist," I am by no means content with his conclusion of the whole matter. "If," he says, "you consent to make your soul a poetic rendering of a phenomenon which, as I have taken more pains than anybody else to show you (!), refuses the yoke of ordinary physical laws, then I, for one, would not object to this exercise of ideality." It is impossible to accept as satisfactory this jaunty concession to the faith of mankind. We know what the Professor means when he relegates a belief to the ideal realm. It is to him, as to many other votaries of physical science, the world of unreality. Rather would I profess with Robert Browning, "God and the soul the only facts for me."

> "Prove them facts ?—That they o'erpass my power of proving, proves them such,"
> "Fact it is I *know* I know not something which is fact as much."

I content myself with this passing protest, for my present design is rather to expose the fallacies of Materialism than directly to vindicate a more rational creed.

I have had more than once to fall back upon the general consciousness of mankind in proof of an assertion. Such appeals are not to be avoided in a discussion like the present, but are not always satisfactory. Some seem to find consciousness a blank, where to others it appears to render a clear verdict. But in regard to the distinction between mind and matter, so far as human knowledge goes, it happens that the question can be brought to a conclusive test. It is this: All material objects appear to occupy a certain space. In the language of metaphysics, extension is an attribute of matter. The mind, on the contrary, with its faculties and affections, cannot be thought of as extended. Neither long measure suits them, nor square, nor cubic; love and hatred, hope and fear, honour and honesty, will and conscience, occupy no space; have neither length, breadth, nor thickness. Weight, and other measures of material force, all of which have relations to space, are equally inapplicable. Mental powers are, as Tyndall puts it in the passage I just now cited, "inexpressible in terms of force and motion." So much is clear beyond all possibility of doubt or cavil.

On this ground we are justified in treating the chasm between mind and matter as, to human conception, absolutely impassable, and that not merely in the present state of physical science, but for ever. In truth, we know more of mind than we do, or ever can, of matter. Men of Tyndall's way of thinking recognise this chasm,—this "fissure," which their "ladder" is too short to cross. But they are under an illusion common in the case of those who limit their studies to physical nature. They place themselves, in idea, *on the wrong side of the gap*. They think they can approach the problems of mind from the side of matter, and try in vain to lay the plank across. But in reality they stand with the rest of us on the opposite edge of the chasm.

We know less, I repeat, of matter than of mind, and always must do so, for the simple reason that we ourselves are minds. Of matter, whatever we may believe, we know directly nothing but its phenomena,—not the thing in itself. Here we may almost shake hands with the school of Hume. How far that school, generally held in reverence by Materialistic thinkers, can go in the direction of pure subjective idealism is shown by John Stuart Mill, who would resolve the external world into "permanent possibilities of sensation." Huxley, too, has hinted at his own possible escape from the platform of Materialism through the same trap-door.

It has been attempted to reform the hypothesis of Materialism in several ways with a view to evade the difficulties which have been pointed out in regard to the evolution of the sentient and intelligent from the non-sentient and non-intelligent. The course pursued has been essentially philosophical, namely, to import into the supposed cause the qualities known to appear in the effect. Mind and a thinking power have accordingly been assumed, either as qualities of the universe of matter as a whole, or of the constituent atoms. Upon the former hypothesis of the universal diffusion of soul in matter, Materialism merges in Pantheism. Such a notion, taught by Paracelsus and others, is well known as the doctrine of *anima mundi*. The other method is adopted by Priestley in his lectures on "Matter and Spirit," commended by Bain as one of the ablest expositions of Materialism in the last century. It has recently been revived in a new shape by the late Professor Clifford, in his doctrine on Mind-stuff, and has even found an expositor amongst ourselves in a pupil of that accomplished and admirable man. My objection to the doctrine, so far as it here concerns us, may easily be anticipated from what has gone before. No theory which disperses sentiency and intellect amongst the atoms composing our bodily frame can account for that conscious unity which is the most intimate of our convictions. Mind as it exists in the atoms is of course to be supposed something less than human; that being so, the summation, or fusion of their intellectual forces, or even the bringing of these forces to a focus, were any such processes imaginable, do not give us the required effects in the production of human consciousness. It is quality which is wanted, and the physicist is ever seeking to fulfil the requirement by accumulating quantity. In illustration of this topic, I cannot forbear borrowing a quotation of Tyndall's, from the German Materialist Ueberweg, in a letter to Lange. The passage is as follows:—" What occurs in the brain would, in my opinion, not be possible, if the process which here appears in its greatest concentration did not obtain generally, only in a vastly diminished degree. Take a pair of mice and a cask of flour. By copious nourishment the animals increase and multiply, and in the same proportion sensation and feelings augment. The quantity of these latter possessed by the first pair is not simply diffused among their descendants, for in that case the last must feel more feebly than the first. The sensations and feelings must necessarily be referred back to the flour, where they exist, weak and pale, it is true, and not concentrated as they are in the brain."

This passage presents itself to me, I confess, as quite a burlesque of the doctrine of Mind-stuff. Ueberweg, it will be seen, prefers to trace the sensations of the increasing family of young mice not to the organific power transmitted through the parents, and impressing a form on the assimilated particles of the food consumed, but to similar feelings, " weak and pale, it is true," in the flour itself! A Cheshire cheese or a bunch of tallow candles would, no doubt, be found to possess like sentiments. Surely Ueberweg, in penning this absurd passage, cannot have reflected that the same particles which might nourish mice might also form the food of a pair of cats, or even of a human couple, and would, in that case, be proved by his argument to possess the sentiments, not of mice alone, but of their natural enemy and of mankind.

At the beginning of this lecture I adverted to the theory of Darwin, as tending to favour the spread of Materialism. Darwin has, in fact, revived " the simple and penetrating thought," as Lange calls it, first offered by Empedocles to the thinkers of antiquity,—that adaptations preponderate in the animated world just because it is their nature to perpetuate themselves; while what fails in adaptation has long since perished. In the light of this idea the appearance of design in creation may seem explicable without resort to the hypothesis of a creative mind. Now and then, though rarely, Mr. Darwin himself writes as if this were a legitimate inference from his theory. Thus at the beginning of the last chapter of his work *On the Origin of Species* * we have the following passage:—

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* Sixth edition, p. 204.

"Nothing at first can appear more difficult to believe than that the more complex organs and instincts should have been perfected, *not* by means superior to, though analogous with, human reason, *but* by the accumulation of innumerable slight variations, each good for the individual possessor." "Surely," observes Martineau, an authority with some, commenting on this passage, "the antithesis could not be more false were we to speak of some patterned damask as made, *not* by the weaver, *but* by the loom; or, of any methodised product as arising, *not* from its primary, *but* from its secondary source. All the determining conditions of species,—viz.: (1) The possible range of variation; (2) its hereditary preservation; (3) the extrusion of inferior rivals,—must be conceived as already contained in the constituted laws of organic life; in, and through which, just as well as by unmeditated starts [or, as he says elsewhere, "creative paroxysms"], reason superior to the human, may evolve the ultimate results." To which I would add that some of the laws of organic life, upon the assumption of which Darwin works out his explanations, are in themselves so marvellous,—for example, a taste for beauty in the female pheasant coincident with our own,—that we may well transfer our wonder from the "patterned damask" to the "loom" itself. And behind these postulated laws a power, as we have seen, is wanted. As Max Müller reminds us, "even Charles Darwin requires a Creator to breathe life into matter,"—and, indeed, a good deal more than mere life. No scientific explanation even touches the ultimate dynamical question. Light is thrown on the methods of creation, but the creative power remains a mystery beyond the sphere of science.

I have thus endeavoured, I fear at too great length, to present you with a sketch of one branch of the argument against corpuscular Materialism (the only popular form of the doctrine of Materialism), as it presents itself to my mind. We are, I have contended, absolutely unable to conceive that the organic and sentient wholes which make up the animal world can have sprung from inorganic, non-sentient atoms, without a new infusion of power, still less that the self-conscious minds which constitute the world of man can have had such an origin. To the difficulties thus raised the Materialist has only one reply, which consists in the hypothesis that the atoms themselves are, from the beginning, endowed with all the powers, including the power of thought, which ultimately make their appearance on the stage of Being. I have endeavoured to show, with the help of better illustration than I myself could bring to bear upon the subject, that even this hypothesis is insufficient to account for the facts and the phenomena, either of sentiency or intellect. The attempt to reform the hypothesis so as to supply at the beginning a cause adequate to all that is finally developed in the result, can only end in that very supposition of a Divine Original which Materialism repudiates. Nothing less than God can be the adequate cause of Man. It has, indeed, latterly been attempted to evade this conclusion in a strange way. To secure the sufficiency of a mechanic force as the origin of things, Man, as the supreme effect, is degraded to the level of an automaton. There is a sort of consistency in thus completely banishing mind from the universe; yet it is strange to think of the trouble these acute intellects are taking to persuade us that we and they alike are mere magnetic mockeries,—the ephemeral result of unstable combinations of matter. By first giving the lie to our perceptive constitution, and then inviting us to confide in suicidal conclusions founded upon data furnished by this discredited witness, they involve themselves in a tissue of contradictions, and we may safely leave their refutation to the common sense of mankind.

The secret sources of disbelief, as of belief, often lie beyond the reach of logic, deep in men's character and history. What appears to me convincing argument may find no way to the recesses of another's mind, may fail to break through the crust of inveterate mental habit, or prove futile in presence of deficiencies which are organic. Yet I hope that to few, to whom the argument may not have been familiar, and who may have been drawn in what seems to me the wrong direction by prevailing tendencies, I may, perhaps, have succeeded in showing that the difficulties of the question are in reality enormous; and that it is at least utterly unwise to draw from Materialistic premises conclusions which are repugnant to practical good sense, or, what is still worse, which seem to liberate us from obligations hitherto deemed sacred.

The CHAIRMAN tendered the thanks of the meeting to Mr. Justice Richmond, and to Mr. David Howard, V.P.I.C., and then read the following communication from the Rev. Canon Saumarez Smith, D.D., Principal of St. Aidan's College :—

BIRKENHEAD, *March* 30.

Sir,

Mr. Richmond's paper seems to me to be an admirable one in tone, in style, in argument. He is careful to avoid all personal censoriousness, whilst he plainly condemns Materialism, and shows it to be an *inadequate* and an *irrational* theory, with a hint also (at the end of the paper) that it is at least, likely to become an *immoral* theory.

The danger to which the writer alludes (p. 322) of "persons unused to philosophical inquiries" being misled by the fascinations of scientific discovery into an acceptance of the dicta of scientists concerning "causation," as if they were "scientific," and *therefore* trustworthy, is, I believe, a very real danger.

The fact is, that when we begin to speak of causes, "originant" forces, "organific" forces, "conscious sensation," and the like, we leave the province of (what is now, by a limitation of the term, called) "science," and become perforce *metaphysicians, i.e.* philosophisers about the non-sensuous or super-sensuous.

And philosophy, if it is to be anything more than negative scepticism or a suicidal process of reasoning, must admit both *mental* and *material* phenomena to be factors in the mighty problem which philosophy is ever endeavouring to solve. This granted, let men push "sensationalist" or "idealist" notions as far as they may, we are driven at last to the ultimate question, What is the "productive power, though unrevealed to sense," which "must be sought for behind the things produced"? Three answers are possible: (1) That of the Materialist *proper*, I believe that from Matter everything is evolved; (2) that of the Theist, I believe that Mind must be the originating force; (3) that of the Agnostic, I do not know. Which answer, then, is most reasonable when we take *all the facts* into consideration? Is it to say with Lange, "The motion of the atoms is sensation"? (p. 8), or to adopt Prof. Clifford's doctrine of mind-stuff, and thus by a glaring *petitio principii* invalidate all after-display of logical acumen? Is it not far more reasonable to say (the ultimate question being, we remember, a "dynamical" one), that our highest notion of productive power, *i.e.* the notion of Mind and Will, must be connected with the primary super-sensuous cause of all motion and energy?

But the Agnostic steps in, and says, "You cannot know this inscrutable Power." Now there is, be it remembered, an ambiguity in the use of this word "know." The Theist, and those who recognise the Bible as the book of highest authority in religious matters, will, to a certain extent, concur with those who say God is inscrutable, or "unknowable." (Psalmists, Prophets, and Apostles, might be cited as intimating that God's ways are "past tracing out.") But is there not a real, though incomplete, knowledge of the supra-human, supra-material causative power attainable by philosophical faith? I mean that faith, which is the rational issue of the exercise of our mental powers upon "metaphysical" questions,—questions which, as Mr. Richmond clearly reminds us, are inseparably associated with the "why" and the "how" to which (physical) scientists can give no answer while acting within their own province; for "the knowledge of a producing cause is beyond the scope of science." The passage in the paper (p. 330), "Man himself . . . . without knowledge" admirably puts before us the necessity of *belief* in some primary cause, and the advantage of the belief of the Theist over that of the Materialist.

The Judge insists with proper emphasis (for it is a cardinal point) upon the fact that the question of originating force is "a question not of quantity but of quality" (p. 331).

"Allow time enough," says the advocate of "natural development," "and everything will come out of the primary granule of matter." But this granule must either have itself possessed a creative power, or it must have been, *in a manner which "science" cannot explain*, endowed with a non-material germ of vitalising and organific energy, which was to be gradually evolved and perpetually sustained.

Whence came the energy? how is it directed into the organising channels? and how did that granule come into existence?

Philosophy says, "We must believe in Mind and Personal Will."

Religion and moral impulses lead us higher, and we say, "We believe in God Almighty, Maker of all things visible and invisible."

This belief in God is, at any rate, a more reasonable and a more adequate answer to our searchings after the cause and origin of things than any Materialistic scheme of philosophy can be.

The last sentence in the paper reminds us that Materialism, when logically carried out, proves to be an *immoral* as well as an irrational and an inadequate theory. (We assert this, while we fully adopt the just reservation made at the beginning of the paper, that some persons who have adopted a Materialistic creed in philosophy have by no means been immoral persons.) It is not merely *mind* but *conscience* that is attacked by Materialism. And our conscience as well as our intellect repels the theory as one which, logically, can find no place for the stupendous problems of sin and righteousness, of right and wrong. These are problems which must present themselves to every thoughtful man, whatever practical conclusion he may come to in the matter of religious belief. A philosophy that ignores these problems is no true philosophy. They are problems with which "science" cannot deal,—problems which "philosophy" must face, but problems on which satisfactory light can only be gained by "revelations" from God.

I am, &c.

Professor Odell said that all classes were, more or less, occupied with the question of Materialism, and he believed that there was no subject of greater importance. On the fourth page of the paper the author said, "On this account Hume and his followers, including Mill and Herbert Spencer. consistently maintain that the knowledge of a producing cause is beyond the scope of science." Was this so? Was the knowledge—he did not mean an absolute, but a partial knowledge—of a producing cause beyond the scope of science? Was such a knowledge beyond the scope of ordinary minds? He (Professor Odell) thought not. They might not see the cause of a particular effect, but they knew there was a cause somewhere. Could they see the world as it was presented to their vision and intelligence in all its might and magnitude, and yet come to the conclusion that there was no cause for it? The whole foundation of society was being undermined by the

Materialism of the present day—the Materialism of such men as Huxley, Spencer, Tyndall, and others, who taught the Materialistic doctrine. Wherever they went, in the marts of commerce or among the students of nature, they found that this Materialism was gaining ground, and gradually undermining the conscience of the nation. In ordinary conversation, in their own homes and among their own families, they found this doctrine making way, while even art and poetry had caught the infection, and were coming down to the mere level of pounds, shillings, and pence. Thus they saw that in all classes of society this Materialism was undermining morality, and he could not do otherwise than believe that it would have a most injurious effect, not only on us as individuals, but also as a country and a people.

Mr. D. Howard, V.P.I.C., said that there were one or two points in connexion with the subject which he thought worthy of special attention; not that there was anything new in them, but there seemed perpetual need of repeating an old story. He believed the popular confusion which prevailed as to the words "cause" and "force," and the fact that we habitually used the word "force" for "energy," and constantly spoke of "force and the correlation of the physical forces" where we undoubtedly meant energy, while we employed the word "cause" in the most lax manner possible, was the reason for a great deal of the Materialism of the present day. Of the evil of all this he thought there could be no doubt. Even with reference to the phrase which had been used with regard to the consistency of Hume and his school, the real explanation of this was to be found in the very lax use made of the word "science," which, with them, meant merely physical science. The fact was that the Materialists and the Semi-materialists were allowed to apply the word "science" solely to physical science; why, he did not know. Aristotle did not admit such a distinction, and no Greek or Latin thinker could possibly have allowed such a confusion of ideas with regard to human knowledge being confined to material phenomena. The very expression "scientific," nowadays, was habitually used in contradistinction to "metaphysical," and even the word "philosophy" was very often used as meaning physical science, while, behind this, there was much confusion as to the real origin of force, which, to many people, was entirely a new proposition. One objection, and in his opinion a fatal one, to the theory that thought is but a form of molecular motion, was, he thought, well put in the paper. If thought, and feeling, and life were the result of the molecular motion of atoms, it was evident that there must be caused thereby a loss of some other form of energy. The theory of the conservation of energy was, that any one of the "physical forces" might be converted into another, the total amount of force remaining unchanged, and that thus one might be measured in terms of another. Thus, to produce the electric light, a perfectly definite amount of engine power must be exerted beyond that required to overcome friction and that lost as heat, and a definite amount of light expressed in candles required a definite amount of power expressed in foot-pounds; on the other hand, in an electric railway a definite loss of electricity was needed to produce a definite motion of the train. If mental energy was of the same nature, if mental force was simply the result of the molecular motion of atoms, it stood to reason that a loss of forces must result when mental thought was produced. Undoubtedly every mental process was accompanied by organic changes of the brain, and, just as when it was said that the food a man consumed kept him warm, so it might be said that food caused thought. With regard to the statement that had been made, that phosphorus was required for the production of thought, he should have been the more struck with this if it were not that some of the lowest forms of fungoid life absolutely required a plentiful supply of phosphorus. If they wished to grow a certain low type of fungus, they must put phosphate into a solution employed for the purpose. If they supposed that the perfection of thought was derivable from the mere presence of phosphorus, let them endeavour to conceive the immense amount of mental energy that must reside in yeast. It was much nearer the mark to suppose that phosphorus was more closely connected with life in some way or other than with thought; but, even if this were so, life was not expressible in terms of motion; that was to say, phosphorus is burnt in the brain, and there was less of the phosphorous compounds in the brain, and more of the highly oxydised compound in the body, after thought than before. But there was a certain amount of heat produced in the burning of that phosphorus, and it did not matter whether the brain thought it or a spore of fungus consumed it. Throughout the whole of the changes of the body they could not find the faintest trace of connexion between the amount of physical energy and the amount of mental energy. It had been well put by Professor Tyndall that there was no such connexion, and it would be well to keep this before the mind, because if it were true it was absolutely fatal to the idea that thought was simply the result of molecular motion,—it might be accompanied by it, but it simply ran alongside of it, if this were true; for, if the doctrine of the correlation of the physical forces were to be accepted as a fact, it was perfectly certain that no mental thought could be produced into the bargain. If physical energy could produce physical energy, it could not produce mental energy without suffering loss, and thus the large universities must greatly interfere with the molecular motion of the universe, and, he should think, must ultimately materially diminish the temperature.

Mr. Hassell urged the gratuitous distribution of such papers as the one just read; the "Secular Propagandist Society" were sowing broadcast publications aimed against Religion, distributing them even at the doors of places of worship.

Rev. J. Fisher, D.D., said that some years ago a learned judge, who was on circuit in Wales, had to speak of certain cases springing from socialistic combinations in that part of the country, and expressed his regret that such effects should have arisen from the so-called philosophy, which, from being the study of the higher classes, had permeated down to the lower ranks until it had brought about results which, if not counteracted, would produce a very sad and serious state of things throughout the country. He (Dr.

Fisher) moved a good deal among the working classes on the south side of the water, and he knew many who a few years ago were steady church-goers who would now say to him,—"We are Materialists, and do not believe a word of what you say." The author had stated at the end of his paper that the difficulties to be overcome in connexion with this question were enormous; but these difficulties were all built on the assumption that nature was body and void. But he would ask, What moved the body? They were told that nothing was done without a cause. What was it moved the atoms? A cause was needed. Then, again, atoms had all the appearance of being manufactured articles. Motion could not be produced without a cause, neither could life, instinct, mind, conscience, nor the moral faculty. Even the scientific theorist assumed everything. "Give me a cause of life or of organisation," was very much like saying, "Give me a fulcrum, and I will move the world." The scientist was without the fulcrum. How to counteract the antagonist views that had been spoken of was no easy matter. It must be remembered that such views were more agreeable than the truth; they released the mind from ties that would otherwise be binding, and gave freedom. It was the old cry over again; men wished to be like God, and to have no superior.

Mr. T. K. Callard, F.G.S., referring to the second page of the paper, said that, although the author seemed to accept Darwin's data, yet that his statements in regard to Darwin's hypothesis were in half irony.

Mr. Dibdin said that was so, and the author put it that even if what he had stated as to Darwin were granted, still, he adds, "the question of original causation is not even approached by the physical researches to which I have alluded."

The meeting was then adjourned.

ORDINARY MEETING, April 17, 1882.

Sir Joseph Fayrer, K.C.S.I., M.D., F.R.S., V.P.,
in the Chair.

The minutes of the last meeting were read and confirmed, and the following elections were announced :

Member :—J. W. Appleton, Esq., Liverpool.

Associates :—The Rt. Rev. the Bishop of Caledonia, British Columbia ; T. Hargreaves, Esq., Accrington ; Rowland Hill, Esq., Ph.D., F.C.S., Romsey; Rev. W. A. Ley, M.A., Herefordshire ; Lady Augusta Graham, Brentwood.

A paper was then read by Surgeon-Major G. C. Wallich, M.D., F.L.S., F.G.S., &c.,

ON THE FALLACY OF THE MATERIALISTIC ORIGIN OF LIFE.

[This paper—describing Dr. Wallich's microscopical observations on the lowest forms of life—was read from the MS., but cannot be inserted here, the author having been prevented by illness from completing it for publication ; the Institute must only hope that, later on, his recovery may enable him to place the paper in its possession.]

The following is the discussion thereon :—

The Chairman (Sir Joseph Fayrer, K.C.S.I., M.D., F.R.S.).—I think I may say to Dr. Wallich that the meeting is greatly indebted to him for his paper. I only wish he had had time to have pursued the subject a little further. But we are grateful to him for what he has done. The subject is a very large one, including the beginning of life, spontaneous generation, evolution, the distinctions between vegetable and animal organisms, and many other matters, all of extreme interest and importance. These are the topics he has brought under our consideration. They are fruitful matters for discussion, and we shall now be glad to hear the remarks of those who have any information to contribute. I hope visitors will on this occasion consider themselves as members, and I will first ask Dr. Lionel Beale to favour us with some remarks.

Professor LIONEL S. BEALE, M.B., F.R.S.—I am here to-night as a visitor only, and in that capacity it affords me great pleasure to offer a few remarks on the paper which has been read to us this evening. It is difficult, however, to know how to speak upon a subject so vast and extensive, and one can scarcely make up one's mind as to which particular part of it can be dealt with at the present moment, and in the limits allowed, with the greatest advantage. I must say that I have listened with the greatest pleasure to Dr. Wallich's remarks. I agree with almost every word he has said, with one or two trifling exceptions; particularly in reference to his latter remarks. I will, however, with your permission, now direct attention to another part of the subject, which is perhaps the most important of all. I propose to offer a few remarks on the view taken by Professor Huxley and other scientific men, both here and on the Continent, in reference to the very important question of the transition from the non-living to the living. I am quite sure we shall agree that this is really the kernel of this most interesting subject. We are constantly told of the gradual passage from the non-living to the living, and the formation of a living thing is often spoken of as if the process were something like the change which takes place in the formation of crystals. Most authorities who support the Materialistic hypothesis draw a parallel between the formation of the lowest forms of living matter and crystals. Now, it must occur to every one who has at all considered the subject of crystallisation, that although there may be great difficulty in explaining the exact nature of the process, yet, nevertheless, it is well known that when a certain material is dissolved in fluid under certain circumstances, and the solution becomes concentrated, crystals are formed. Every tyro in chemistry has, probably, performed the experiment with common salt; and every such tyro, after having crystallised common salt, has re-dissolved it, and re-crystallised it again and again; and, if he were to go on crystallising and dissolving to the end of time, he would only produce crystals of the same form and the same chemical composition. Now, let him try to do this with regard to a living organism. The living organism is there. We know that every particle of living matter has come from a pre-existing living particle; but let us endeavour to take ourselves back to the time when there existed only the non-living, the inorganic matter out of which the living had to be formed according to a method, as is affirmed, somewhat resembling that of crystallisation. The chemical compounds that form the living matter—oxygen, hydrogen, nitrogen, and carbon—are supposed to come together in obedience to certain attractions and affinities which these primitive particles possess, but of which we know very little; but let us suppose a living thing is formed. Let us imagine the particles brought together in the manner supposed, and that a particle of living matter makes its appearance. We examine this particle, and try to ascertain its nature, and for this purpose we try, as we have tried in the case of the crystal, to dissolve it. What is the result? We destroy it; we do not dissolve it. It ceases to be living matter before solution begins. It is no longer what it was before, and we cannot make it so. It has gone; it has ceased to be what it was, and we are not dealing with a living particle, but simply with the material that has resulted from the death of that which was before alive. We cannot re-form it. Once dead, it is incapable of being re-produced. Therefore, it seems to me a most extraordinary thing that some of the greatest authorities in science should pretend to compare the formation of living matter with the formation of crystals. There is not the slightest analogy, nor the faintest possible parallel, no comparison between living things and crystals. There is all the difference in the world between the process of crystallisation and the formation of living particles, which are supposed by Haeckel, and others who adopt his views, to be alike. Whatever may be the marvellous changes that occurred in the first formation of living matter, they cannot resemble in the slightest degree any phenomena with which we are familiar. There are no properties of matter that have as yet been discovered that can give us the faintest conception of the nature of the changes which must have taken place when the first living thing was formed. With regard to the question of complexity and simplicity, of which a good deal has been said, I will just offer a few remarks, and will then sit down. It seems to me to have been assumed in a most extraordinary way that some forms of living matter are extremely simple and that others are extremely complex. I should like to ask what is the meaning attached to these terms "simplicity" and "complexity," when applied to living matter? Let us take the monera, said to be among the simplest forms of living matter with which we are acquainted. All we can see is clear, colourless, transparent, structureless, semifluid matter. Where is the evidence that the composition of this is more simple than that of the most complex living matter in existence? Take, for example, the highest form of living matter we know—the living matter which forms part of the brain-cells of man himself, for I suppose we cannot conceive anything much higher. If we were to assume gradations of complexity and different degrees of superiority, we might go as far as to suggest that at any rate the highest and most complex living matter is to be found in the grey matter constituting the outer part of the human brain. But what is the fact? The matter we find there is no more complex than the living matter of the simplest monad, as far, at least, as we know. If we take this brain matter and examine it, we find that we can resolve it into certain organic substances, closely allied to the albuminous material which Professor Huxley and others call protoplasm, although they are not able to define precisely what they mean by the term. They are unable to tell us in what way protoplasm differs from albumen, and muscle, tissue, and a thousand other things. They simply make use of a name almost without a meaning. Well, the highest conceivable form of living matter, as far as we know, closely accords in its composition with the lowest form of living matter; and, as far as regards structure, if we examine that which comes from the highest organism, and that which is concerned in the formation of the lowest, no difference whatever can be distinguished. It is not that one is more complicated, or exhibits a structure different from the other. There is no structure in either. Both are perfectly clear, transparent, and structureless, and yet one is concerned in the performance of certain functions and offices, while the other is concerned in the performance of totally different functions and offices. Are we, then, to believe that the difference in the functions discharged is due merely to the chemical properties of the substances of which the living matter is composed? We cannot do this, because, when we come to analyse the two different kinds of living matter, we find in the material which results from their death the same elements. And, if the elements are not in precisely the same amounts or in the same proportions to one another, the difference which may exist in the composition bears no relation and has no reference that can be discovered, either to the difference in action or to the different structures which may be evolved from the two different forms of living matter. Therefore the terms "simplicity" and "complexity" seem to me to be totally inadmissible, and I venture to think that not one of those who are in the habit of speaking of simple and complex forms can give a rational explanation of what he means by the phrases he employs. What is generally meant by the simplest form of living matter is that when it attains its highest form of development it is still a simple thing, and what seems to be understood by that of the greatest complexity is, that when it attains its highest degree of development certain marvellous structures are produced; but when we come to look at the living matter itself there is no difference to be discerned by any means of examination yet adopted between the two forms. The living matter, which, at the very earliest period of his development, represents man, is, as far as I know, not distinguishable from the forms of living matter of which the simple bodies Dr. Wallich has so lucidly described to us are made up. And, therefore, the difference cannot be chemical. Neither can it be called physical, nor mechanical, nor can it be due to difference in machinery or mechanism, for none is to be discovered. The difference is enormous, and it is of a most remarkable kind, but it is not to be explained by any facts in physical science with which we are acquainted. All we know is, that under certain conditions one form of living matter *grows* and produces a certain kind of structure, and that under different conditions certain other forms of living matter *grow* and produce a structure that is totally different. The difference between the two is not in molecular or chemical constitution. They do not remarkably differ in chemical composition, and we may safely say it is impossible thus to explain the difference. That is the whole of the matter; the difference in the results cannot be explained by physics or chemistry, and I do not think it ever will be so explained. The difference is one which can only be spoken of under another term altogether, and this is a word to which many object very strongly. I allude to the word "vital." The difference in question is a vital difference, dependent not on a property which belongs to matter itself as matter, or derived from any properties in connexion with the elements which enter into the composition of the living matter. Whether the generation of living matter was spontaneous or not cannot be proved, but much scientific speculation is built upon the theory of spontaneous generation. However necessary such a theory may be to the doctrine of evolution, there are no scientific facts which can at all warrant the conclusion that non-living matter only, under any conceivable circumstances, can be converted into living matter, or at any previous time has, by any combination, or under any conditions that may have existed, given rise to the formation of anything which possesses, or has possessed, life.

Mr. D. Howard, V.P.I.C.—I feel that I cannot do less than add my personal thanks to those of others, for the exceedingly interesting and able way in which Dr. Wallich has brought this subject before us to-night. The subject is one the importance of which we cannot over-estimate. Professor Beale has very clearly put before us the question as to what is the real issue between Haeckel and Dr. Wallich ; namely, whether living protoplasm is, or is not, essentially different from dead protoplasm. We have in this substance called bathybius—which certainly did seem surprising until the marvel vanished, in a great measure, under Dr. Wallich's investigations—a body of matter that was supposed to be neither living nor dead, a body which nourished itself, and which remained continuously in this one state of existence, and which yet had no organisation and no parts ; it is only the careful observation of those who, like Dr. Wallich, have made the microscope their study, that can be brought to bear in a satisfactory manner on this bathybius theory. We now know how completely it is shown that, throughout that scum of life which is found extending over so wide an area at the bottom of the sea, there are living and dead organisms, and that there is an absolute distinction between those monera which are living and the dead monera. Therefore, we have the problem fully decided against those who maintain the spontaneous generation theory, the difference being as complete as that which exists between living and dead human bodies. It is only the minutest microscopic investigation that will show all this. In microscopes of only a moderate power this mass of ocean slime seems to possess nowhere any individuality, but appears to be altogether unorganised, and it is certainly surprising to find it proved that this large mass of matter is composed of individual organisms, the life of each of which can be traced with all the beautiful and minute accuracy with which Dr. Wallich has brought it before us—each monad having its own mysterious life, more difficult to imagine even than our own, the very simplicity of the organism making the problem stupendously difficult. Therefore, to come back to the point from which we start, even in the very lowest stratum we are no nearer the solution of the problem of life than we are when dealing with the highest. If Haeckel, who has boldly asserted this low form of life to be the secret of the origin of life, would but look the facts in the face, he would be obliged to confess that he is as little able to explain the origin of life in the minute organisms of which we have heard as he is to explain the origin of the life of the most highly-organised human being.

Dr. WALLICH.—I am delighted that I have had the opportunity—imperfect though my efforts may have been—of raising this discussion, and am much obliged to the members of the Society present for the kind and indulgent manner in which they have listened to what, I am afraid, has been a very imperfect statement.

The meeting was then adjourned.

NATURAL HISTORY.

MEETING, MAY 1, 1882.

SIR JOSEPH FAYRER, K.C.S.I., M.D., F.R.S., V.P.,
IN THE CHAIR.

The minutes of the last meeting were read and confirmed, and the following elections were announced :—

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Also the presentation for the library of the following works :—

"The Institutes of Equity." By W. Griffith, Esq.	*From the same.*
"List of French Works." Dulau.	*Ditto.*

A lecture "On the Composition and Microscopical Structure of Coal"* was then read by Professor P. F. Reinsch. A discussion ensued, in which Sir Joseph Fayrer, Mr. S. R. Pattison, F.G.S., Mr. T. K. Callard, F.G.S., Mr. Griffith, Mr. D. Howard, V.P.I.C., Mr. E. Charlesworth, F.G.S., and Capt. F. Petrie, F.G.S., took part. The Institute has since communicated with known English geologists in regard to the author's views, which further investigations may materially modify.

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* Professor Reinsch has published a work in Germany upon the subject.

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OBJECTS, CONSTITUTION, AND BYE-LAWS

OF

The Victoria Institute,

OR

Philosophical Society of Great Britain.

Adopted at the First Annual General Meeting of the Members and Associates, held on Monday, May 27th, 1867.

(*Revised at the Annual Meeting, June* 15, 1874, *and Jan.* 4, 1875.)

§ I. *Objects.*

1. The Victoria Institute, or Philosophical Society of Great Britain, is established for the purpose of promoting the following objects, viz.:—

First. To investigate fully and impartially the most important questions of Philosophy and Science, but more especially those that bear upon the great truths revealed in Holy Scripture; with the view of reconciling any apparent discrepancies between Christianity and Science.

Second. To associate together men of Science and authors who have already been engaged in such investigations, and all others who may be interested in them, in order to strengthen their efforts by association; and, by bringing together the results of such labours, after full discussion, in the printed transactions of an Institution: to give greater force and influence to proofs and arguments which might be little known, or even disregarded, if put forward merely by individuals.

Third. To consider the mutual bearings of the various scientific conclusions arrived at in the several distinct branches into which Science is now divided, in order to get rid of contradictions and conflicting hypotheses, and thus promote the real advancement of true Science; and to examine and discuss all supposed scientific results with reference to final causes, and the more comprehensive and fundamental principles of Philosophy proper, based upon faith in the existence of one Eternal God, who, in His wisdom, created all things very good.

Fourth. To publish Papers read before the Society in furtherance of the above objects, along with full reports of the discussions thereon, in the form of a Journal, or as the Transactions of the Institute.

Fifth. When subjects have been fully discussed, to make the results known by means of Lectures of a more popular kind, and to publish such Lectures.

Sixth. To publish English translations of important foreign works of real scientific and philosophical value, especially those bearing upon the relation between the Scriptures and Science; and to co-operate with other philosophical societies at home and abroad, which are now or may hereafter be formed, in the interest of Scriptural truth and of real science, and generally in furtherance of the objects of this Society.

Seventh. To found a Library and Reading Rooms for the use of the Members and Associates of the Institute, combining the principal advantages of a Literary Club.

§ II. *Constitution.*

1. The Society shall consist of Members and Associates, who in future shall be elected as hereinafter set forth.

2. The government of the Society shall be vested in a Council, to which members only shall be eligible, consisting of a President, two or more (not exceeding seven) Vice-presidents, a Treasurer, one or more Honorary Secretaries, and twelve or more (not exceeding twenty-four) Ordinary Members of Council, who shall be elected at the Annual General Meeting of the Members and Associates of the Institute. But, in the interval between two annual meetings,

vacancies in the Council may be filled up by the Council from among the Members of the Society; and the Members chosen as Trustees of the funds of the Institute shall be *ex officio* Members of Council.

3. Any person desirous of becoming a Member or Associate shall make application for admission by subscribing the Form A of the Appendix, which must be signed by two Members of the Institute, or by a Member of Council, recommending the candidate for admission as a Member; or by any one Member of the Institute, for admission as an Associate.

4. Upon such application being transmitted to one of the Secretaries, the candidate for admission may be elected by the Council, and enrolled as a Member or Associate of the Victoria Institute, in such manner as the Council may deem proper; having recourse to a ballot, if thought necessary, as regards the election of Members; in which case no person shall be considered as elected unless he have three-fourths of the votes in his favour.

5. Application for admission to join the Institute being thus made by subscribing Form A, as before prescribed, such application shall be considered as *ipso facto* pledging all who are thereupon admitted as Members or Associates to observe the Rules and Bye-Laws of the Society, and as indicative of their desire and intention to further its objects and interests; and it is also to be understood that only such as are professedly Christians are entitled to become *Members.*

6. Each Member shall pay an Entrance Fee of One Guinea and an Annual Contribution of Two Guineas. A Donation of Twenty Guineas shall constitute the donor a Life Member.

7. Each Associate shall pay an Annual Contribution of One Guinea. A donation of Ten Guineas shall constitute the donor a Life Associate.

8. The Annual Contributions shall be considered as due in advance on the 1st day of January in each year, and shall be paid within three months after that date; or, in the case of new admissions, within three months after election.

9. Any Member or Associate who contributes a donation in one sum of not less than Sixty Guineas to the funds of the Institute shall be enrolled as a Vice-Patron thereof, and will thus also become a Life Member or Life Associate, as the case may be.

10. Should any member of the Royal Family hereafter become the Patron, or a Vice-Patron, or Member of the Institute, the con-

nexion shall be regarded as purely Honorary; and none of the Rules and Bye-Laws relating to donations, annual contributions, or obligations to serve in any office of the Society, shall be considered as applicable to such personages of Royal Blood.

11. Any Member or Associate may withdraw from the Society at any time, by signifying a desire to do so by letter, addressed to one of the Secretaries; but such shall be liable for the contribution of the current year, and shall continue liable for the annual contribution, until all sums due to the Society from such Member or Associate shall have been paid, and all books or other property borrowed from the Society shall have been returned or replaced.

12. Should there appear cause, in the opinion of the Council, for the exclusion from the Society of any Member or Associate, a private intimation may be made by direction of the Council, in order to give such Member or Associate an opportunity of withdrawing from the Society; but, if deemed necessary by the Council, a Special General Meeting of Members shall be called for the purpose of considering the propriety of expelling any such person: whereat, if eleven or more Members shall ballot, and a majority of those balloting shall vote that such person be expelled, he shall be expelled accordingly. One month's notice, at least, shall be given to the Members of any such Special General Meeting.

13. Non-resident Members and Associates, or others desirous of promoting the objects and interests of the Institute, may be elected by the Council to act as Corresponding Members abroad, or as Honorary Local Secretaries, if within the United Kingdom, under such arrangements as the Council may deem advisable.

14. The whole property and effects of the Society shall be vested in two or more Trustees, who shall be chosen at a General Meeting of the Society.

14*a*.* Special donations to the general fund, whether from Members, Associates, or others desirous of promoting the objects and interests of the Institute, shall be invested in the names of the Trustees.

14*b*. The Trustees are empowered to invest the Endowment Fund in other securities than Three per Cent. Annuities, such other securities being the Bonds of the Corporation of London, or Guaranteed Indian Railway Debentures, or Debenture Stocks.

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* This paragraph was added with a view to enabling the Institute to receive special donations towards an endowment fund, the word "general being intended to signify that fund.

14*c*. All moneys received on account of the Institute shall be duly paid to its credit at the Bankers, and all cheques shall be drawn, under authority of the Council, and shall be signed by the Honorary Treasurer and Honorary Secretary.

15. The accounts shall be audited annually, by a Committee, consisting of two Members,—one of whom may be on the Council,—to be elected at an Ordinary Meeting of the Society preceding the Anniversary Meeting. This Committee shall make a written Report to the Council at the first Meeting after such audit, and also to the Institute, upon the day of the Annual General Meeting,—stating the balance in the Treasurer's hands and the general state of the funds of the Institute.

16. Both Members and Associates shall have the right to be present to state their opinion, and to vote by show of hands at all General and Ordinary Meetings of the Society; but Members only shall be entitled to vote by ballot, when a ballot is taken in order to determine any question at a General Meeting.

§ III. *Bye-Laws* (Privileges).

1. A Member or Associate, when elected, shall be so informed by the Secretary in a printed copy of the letters, Form B, in the Appendix.

2. Members and Associates shall not be entitled to any privileges, or have the right to be present, or to vote at any of the Meetings of the Society, till they have paid the contributions due by them.

3. Annual subscriptions shall be considered as in arrear, if not paid on or before 31st March in each year, or within three months after election, as the case may be.

4. Should any annual subscription remain in arrear to the 30th June, or for six months after election, the Treasurer shall cause to be forwarded to the Member or Associate from whom the subscription is due, a letter, Form D, in the Appendix, unless such Member or Associate reside out of the United Kingdom; in which case the Form D shall not be sent unless the subscription continues unpaid till the 30th September.

5. If any arrears be not paid within twelve months, the Council

shall use their discretion in erasing the name of the defaulter from the list of Members or Associates.

6. Members shall be entitled to introduce two Visitors at the Ordinary Meetings of the Society; and to have sent to them a copy of all the papers read before the Society, which may be printed in its Transactions* or otherwise, and of all other official documents which the Council may cause to be printed for the Society; they will also be entitled to a copy of all such translations of foreign works or other books as are published under the auspices of the Society in furtherance of Object 6 (§ I.)

7. Associates may introduce one visitor at the Ordinary Meetings, and shall be entitled to all the minor publications of the Society, and to a copy of its Transactions during the period of their being Associates, but not to the translations of foreign works or other books above referred to.† It shall, however, be competent to the Council of the Society, when its funds will admit of it, to issue the other publications of the Society to Associates, being ministers of religion, either gratuitously or at as small a charge as the Council may deem proper.

8. When it shall be found necessary to send the letter, Form D, to any Member or Associate who may be in arrear, the printed papers and other publications of the Society shall cease to be sent to such Member or Associate till the arrears are paid; and, until then, he shall not be allowed to attend any Meeting of the Society, nor have access to any public rooms which may be in its occupation.

9. The Library‡ shall be under the management and direction of the Council, who are empowered to designate such works as shall not be allowed to circulate.

10. Each Member§ shall be allowed to borrow books from the Library, and to have not more than three volumes in his possession at the same time; pamphlets and periodical publications not to be kept above fourteen days, nor any other book above three weeks.

11. Members who may borrow books from the Library shall be answerable for the full value of any work that is lost or injured.

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* And the Transactions issued in the years during which they have not subscribed may be purchased at half price.

† These, as well as the Transactions issued in the years during which they have not subscribed, may be purchased at half price.

‡ For the use of the Members and Associates.—*See 7th Object.*

§ Members only are allowed to take books away.

12. Periodical publications shall remain on the table for a month, other books for a fortnight, after they are received.

13. When a book or pamphlet is wanted, and has been the stipulated time in the possession of any Member, the Secretary shall request its return, and a fine of threepence a day shall be incurred for every day it may be detained, which fine shall commence on the third day after the transmission of the notice in the case of town Members, and after the sixth day in the case of country Members; and until the return of such works, and the discharge of all fines incurred, no further issue of books shall be permitted to the Member applied to.

14. The books shall be ordered in for inspection at such times as the Council shall appoint, and a fine of half-a-crown shall be incurred for neglecting to send in books by the time required in the notice.

15. A Book shall lie on the Library table in which Members may insert, for the consideration of the Council, the titles of such works as they desire to be purchased for the Institute.

§ IV. *Bye-Laws* (General, Ordinary, and Intermediate Meetings).

1. A General Meeting of Members and Associates shall be held annually on May 24th (being Her Majesty's birthday, and the Society's anniversary), or on the Monday following, or on such other day as the Council may determine as most convenient, to receive the Report of the Council on the state of the Society, and to deliberate thereon; and to discuss and determine such matters as may be brought forward relative to the affairs of the Society; also, to elect the Council and Officers for the ensuing year.

2. The Council shall call a Special General Meeting of the Members and Associates, when it seems to them necessary, or when required to do so by requisition, signed by not less than ten Members and Associates, specifying the question intended to be submitted to such Meeting. Two weeks' notice must be given of any such Special General Meeting; and only the subjects of which notice has been given shall be discussed thereat.

3. The Ordinary Meetings of the Society shall usually be held on the first and the Intermediate Meetings on the third Monday evenings in each month, from November to June inclusive, or on such other evenings as the Council may determine to be convenient: and a printed card of the meetings for each Session shall be forwarded to each Member and Associate.

4. At the Ordinary and Intermediate Meetings the order of proceeding shall be as follows:—The President, or one of the Vice-Presidents, or a Member of the Council, shall take the chair at 8 o'clock precisely, the minutes of the last Ordinary or Intermediate Meeting shall be read aloud by one of the Secretaries, and, if found correct, shall be signed by the Chairman; the names of new Members and Associates shall be read; the presents made to the Society since their last Meeting shall be announced; and any other communications which the Council think desirable shall be made to the Meeting. After which, the Paper or Papers intended for the evening's discussion shall be announced and read, and the persons present shall be invited by the Chairman to make any observations thereon which they may wish to offer.

> The claims of Members and Associates to take part in a discussion are prior to those of Visitors. The latter, when desiring to speak upon any Paper, must first send their cards to the Chairman and ask permission (unless they have been specially invited by the Council "to attend, and join in considering the subject before the Meeting," or are called upon by the Chairman). 1875.

5. The Papers read before the Society, and the discussions thereon, fully reported, shall be printed by order of the Council; or, if not, the Council shall, if they see fit, state the grounds upon which this Rule has been departed from, in the printed Journal or Transactions of the Society.

6. The Council may at their discretion authorize Papers of a general kind to be read at any of the Ordinary or Intermediate Meetings, either as introductory lectures upon subjects proper to be afterwards discussed, or as the results of discussions which have taken place, in furtherance of the 5th Object of the Society (§ I.).

7. With respect to Intermediate Meetings, the Papers read at which are not necessarily printed nor the discussions reported,* the Council, at its discretion, may request any lecturer or author of a paper to be read thereat, previously to submit an outline of the proposed method of treating his subject.

8. At the Ordinary or Intermediate Meetings no question relating to the Rules or General Management of the affairs of the Society shall be introduced, discussed, or determined.

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* So arranged when the "Intermediate Meetings" were commenced 16th January, 1871.

V. *Bye-Laws* (Council Meetings).

1. The Council shall meet at least once every month from November to June inclusive, or at any other time and on such days as they may deem expedient. The President, or any three Members of the Council, may at any time call a special Meeting, to which the whole Council shall be summoned.

2. At Council Meetings three shall be a quorum; the decision of the majority shall be considered as the decision of the Meeting, and the Chairman shall have a casting vote.

3. Minutes of the proceedings shall be taken by one of the Secretaries, or, in case of his absence, by some other Member present, whom the Chairman may appoint; which minutes shall afterwards be entered in a minute-book kept for that purpose, and read at the next Meeting of the Council, when, if found correct, they shall be signed by the Chairman.

§ VI. *Bye-Laws* (Papers).

1. Papers presented to be read before the Society shall, when read, be considered as the property of the Society, unless there shall have been any previous engagement with its author to the contrary; and the Council may cause the same to be published in any way and at any time they may think proper after having been read. If a Paper be not read, it shall be returned to the author; and, if a Paper be not published within a reasonable time after having been read, the author shall be entitled himself to publish it, and he may borrow it for that purpose.

2. When a Paper is sent to the Society for the purpose of being read, it shall be laid before the Council, who shall refer it to two of that body, or of the other Members or Associates of the Society whom they may select, for their opinions as to the character of the Paper and its fitness or otherwise for being read before the Society, which they shall state as briefly as may be, in writing, along with the grounds of their respective opinions. Should one of such opinions be adverse to the Paper and against its being read before the Society, then it shall be referred to some other referee, who is unaware of the opinion already pronounced upon the Paper, in order that he may state his opinion upon it in like manner. Should this opinion be adverse to the Paper, the Council shall then consult and

decide whether the Paper shall be rejected or read; and, if rejected, the Paper shall be returned to the author with an intimation of the purport of the adverse opinions which have been given with respect to it; but the names of the referees are not to be communicated to him, unless with their consent or by order of the Council. All such references and communications are to be regarded as confidential, except in so far as the Council may please to direct otherwise.

3. The Council may authorise Papers to be read without such previous reference for an opinion thereon; and when a Paper has been referred, and the opinion is in favour of its being read in whole or in part, the Council shall then cause it to be placed in the List of Papers to be so read accordingly, and the author shall receive due notice of the evening fixed for its reading.

4. The authors of Papers read before the Society shall, if they desire it, be presented with twenty-five separate copies of their Paper, with the discussion thereon, or with such other number as may be determined upon by the Council.

§ VII. *Bye-Laws* (General).

1. The government of the Society, and the management of its concerns are entrusted to the Council, subject to no other restrictions than are herein imposed, and to no other interference than may arise from the acts of Members in General Meeting assembled.

2. With respect to the duties of the President, Vice-Presidents, and other Officers and Members of Council, and any other matters not herein specially provided for, the Council may make such regulations and arrangements as they deem proper, and as shall appear to them most conducive to the good government and management of the Society, and the promotion of its objects. And the Council may hire apartments, and appoint persons not being Members of the Council, nor Members or Associates of the Institute, to be salaried officers, clerks, or servants, for carrying on the necessary business of the Society; and may allow them respectively such salaries, gratuities, and privileges, as to them, the Council, may seem proper; and they may suspend any such officer, clerk, or servant from his office and duties, whenever there shall seem to them occasion; provided always, that every such appointment or suspension shall be reported by the Council to the next ensuing General Meeting of the Members, to be then confirmed or otherwise, as such Meeting may think fit.

FORM OF APPLICATION *for the Admission of Vice-Patrons, Members, or Associates of the* VICTORIA INSTITUTE.

[*Date*]____________________188 .

*I hereby desire to be enrolled a** ____________________ *of the* VICTORIA INSTITUTE, OR PHILOSOPHICAL SOCIETY OF GREAT BRITAIN.

* *Here insert* Vice-Patron, *or* Member, *or* Life Member, *or* Associate, *or* Life Associate.	*Candidate's ordinary Signature, and full name, if necessary.*	____________________ ____________________
	Title, Profession, University degree, &c., or other distinction.	____________________ ____________________
	Address ____________________	
	If an Author, the name of the Candidate's works may be here stated.	____________________ ____________________

____________________ ____________________	To be signed by a Member or Associate or a Member of Council, or an Honorary Officer of the Institute, in the case of a Member; or by any one Member or Associate in the case of an Associate.

To the Honorary Officers of the VICTORIA INSTITUTE,
7, Adelphi Terrace, Strand, London, W.C.

FORM B.

SIR, 18 .

I have the pleasure to inform you, with reference to your application dated the , that you have duly been elected a of the VICTORIA INSTITUTE, OR PHILOSOPHICAL SOCIETY OF GREAT BRITAIN.

I have the honour to be, Sir,
Your faithful Servant,

____

To ____________________ *Hon. Sec.*

FORM C.

(*Bankers*) Messrs. ______________________________

* Please pay Messrs. RANSOM, BOUVERIE, & Co. my Annual Contribution of Two GUINEAS to the VICTORIA INSTITUTE, due on the 1st of January, 188 , and the same amount on that day in every succeeding year, until further notice.

I am,
Your obedient Servant,

____

_____________________188 .

If this Form be used, please add your Signature, Banker's Name, and the Date, and return it to the Office, 7, Adelphi Terrace. Receipt-stamp required.

* The above is the form for Members. The form for Associates is the same except that the Subscription stands as "ONE GUINEA."

FORM D.

SIR, 18 .

I am directed by the Council of the VICTORIA INSTITUTE to remind you that the Annual Contribution due by you to the Society for the year is now six months in arrear; and I have to call attention to the Bye-Laws of the Institute, § III., ¶ 4 and 8, and to request you to remit to me the amount due (viz. £) by Post-office order or otherwise, at your earliest convenience.

I have the honour to be, Sir,
Your faithful Servant,

____

To ____________________ *Treasurer.*

FORM E.

FORM OF BEQUEST.

I give and bequeath to the Trustees or Trustee for the time being of THE VICTORIA INSTITUTE, OR PHILOSOPHICAL SOCIETY OF GREAT BRITAIN, to be applied by them or him for the purposes of the said Society, the sum of £ , such sum to be wholly paid out of such part of my personal estate as may be lawfully applied to the purposes of charity, and in priority to all other legacies. And I declare that the receipt of the Trustees or Trustee for the time being of the said Society shall be a good discharge to my Executors for the said legacy.

The Journal is arranged so as to secure its special usefulness to Country and Foreign Members and Associates (who form two-thirds of the Institute).

The Journal contains the Papers read at the Meetings, and the Discussions thereon.

Before they are published in the Journal, the papers themselves and the discussions, are revised and corrected by their Authors, and MS. comments and supplementary remarks are added, which have been sent in by those Home and Foreign Members to whom, as being specially qualified to pronounce an opinion upon the respective subjects, proof copies of the Papers have been submitted for consideration. These arrangements, which cannot but add to the value of the Journal, are carried out with a view to the advantage of all, especially Country and Foreign Members, who thus find in the Journal much valuable matter, in addition to that which had come before those actually present at the Meetings.

PROGRESS OF THE INSTITUTE.

Members and Associates on 1st January, 1871, 203. Joined since.—In 1871, 91;—1872, 109;—1873, 110;—1874, 111;—1875, 115;—1876, 107;—1877, 100;—1878, 101;—1879, 105;—1880, 104;—1881, 122;—1882, 122 (70 Town and Country, 52 Colonial).

THE JOURNAL OF THE TRANSACTIONS.

Since the Inauguration of the Society, on the 24th of May, 1866, the following Papers have been read :—The Quarterly Parts of the Journal are indicated by the numbers prefixed. (*The volumes are sold at One Guinea to Non-Members; Half-a-Guinea to Members and Associates; those issued during the years of subscription are not charged for.*)

FIRST SERIES, VOLS. 1 TO 5.

VOL. I.

1. A Sketch of the Existing Relations between Scripture and Science. By the late George Warington, Esq., F.C.S.

2. On the Difference in Scope between Scripture and Science. By the late C. Mountford Burnett, Esq., M.D., Vice-President V.I.

On Comparative Philology. By the Rev. Robinson Thornton, D.D., Vice-President V.I.

On the Various Theories of Man's Past and Present Condition. By the late James Reddie, Esq., Hon. Sec. V.I.

3. On the Language of Gesticulation and Origin of Speech. By Professor J. R. Young.

On Miracles: their Compatibility with Philosophical Principles. By the Rev. W. W. English, M.A.

Thoughts on Miracles. By the late E. B. Penny, Esq.

On the General Character of Geological Formations. By the late E. Hopkins, Esq., C.E.

4. On the Past and Present Relations of Geological Science to the Sacred Scriptures. By the Rev. Professor John Kirk.

On the Lessons taught us by Geology in relation to God. Rev. J. Brodie, M.A.

On the Mutual Helpfulness of Theology and Natural Science. By Dr. Gladstone, F.R.S.

On Falling Stars and Meteorites. By the late Rev. W. Mitchell, M.A., Vice-President V.I.

(*The above Papers, with the Discussions thereon, and with "Scientia Scientiarum" being some Account of the Origin and Objects of the Victoria Institute," with the Reports of the Provisional Proceedings, and the Inaugural Address by the late Rev. Walter Mitchell, M.A., Vice-President, form Volume I. of the "Journal."*)

VOL. II.

5. On the Terrestrial Changes and Probable Ages of the Continents, founded upon Astronomical Data and Geological Facts. By the late Evan Hopkins, Esq., C.E., F.G.S.

On the Credibility of Darwinism. By the late George Warington, Esq., F.C.S.

On the Credibility of Darwinism. By the late James Reddie, Esq., Hon. Sec. V.I.

6. On Utilitarianism. By the late James Reddie, Esq., Hon. Sec. V.I.

On the Logic of Scepticism. By the Rev. Robinson Thornton, D.D., V.P.

Annual Address (On the Institute's Work). By the late James Reddie, Esq., Hon. Sec. V.I.

7. On the Relations of Metaphysical and Physical Science to the Christian Doctrine of Prayer. By the Rev. Professor John Kirk.

8. On Geological Chronology, and the Cogency of the Arguments by which some Scientific Doctrines are supported. (In reply to Professor Huxley's Address delivered at Sion College on 21st Nov., 1867.) By the late J. Reddie, Esq., Hon. Sec. V.I. (1867–68).

On the Geometrical Isomorphism of Crystals, and the Derivation of all other Forms from those of the Cubical System. (6 *Plates.*) By the late Rev. W. Mitchell, M.A., V.P.

VOL. III.

9. On the Antiquity of Civilisation. By the Right Rev. Bishop Titcomb, D.D.

On Life, with some Observations on its Origin. By J. H. Wheatley, Esq., Ph.D.

On the Unphilosophical Character of some Objections to the Divine Inspiration of Scripture. By the late Rev. Walter Mitchell, M.A.

On Comparative Psychology. By E. J. Morshead, Esq., Hon. For. Sec. V.I.

10. On Theology as a Science. By the Rev. A. De la Mare, M.A.

On the Immediate Derivation of Science from the Great First Cause. By R. Laming, Esq

On some of the Philosophical Principles contained in Mr. Buckle's "History of Civilisation," in reference to the Laws of the Moral and Religious Developments of Man. By the Rev. Prebendary C. A. Row, M.A.

On the Nature of Human Language, the Necessities of Scientific Phraseology, and the Application of the Principles of both to the Interpretation of Holy Scripture. By the Rev. J. Baylee, D.D.
11. On the Common Origin of the American Races with those of the Old World. By the Right Rev. Bishop Titcomb, D.D.
On the Simplification of First Principles in Physical Science. By the late C. Brooke, F.R.S.
On the Biblical Cosmogony scientifically considered. By late G. Warington, Esq., F.C.S.
On Ethical Philosophy. By the Rev. W. W. English, M.A.
12. On some Uses of Sacred Primeval History. By the late D. McCausland, Esq., Q.C., LL.D.
On the Relation of Reason to Philosophy, Theology, and Revelation. By the Rev. Preb. C. A. Row, M.A.

VOL. IV.

13. Analysis of Human Responsibility. By the Rev. Prebendary Irons, D.D. (And part 16.)
On the Doctrine of Creation according to Darwin, Agassiz, and Moses. By Prof. Kirk.
14. On the Noachian Deluge. By the Rev. M. Davison.
On Life—Its Origin. By J. H. Wheatley, Esq., Ph.D.
On Man's Place in Creation. By the late Professor Macdonald, M.D.
15. On More than One Universal Deluge recorded in Scripture. By the Rev. H. Moule, M.A.
On Certain Analogies between the Methods of Deity in Nature and Revelation. By the Rev. G. Henslow, M.A., F.L.S.
On the Respective Provinces of the Observer and the Reasoner in Scientific Investigation. By the Rev. Edward Garbett, M.A.
On the Credulity of Scepticism. By the Rev. R. Thornton, D.D., V.P.
16. On Current Physical Astronomy. By the late J. Reddie, Esq., Hon. Sec. V.I.
Analysis of Human Responsibility. By Rev. Preb. Irons, D.D. (See part 13.) *Concluded.*

VOL. V.

17. On the Origin of the Negro. By the Right Rev. Bishop Titcomb, D.D.
On the Testimony of Philosophy to Christianity as a Moral and Spiritual Revelation. By the Rev. Preb. C. A. Row, M.A.
On the Numerical System of the Old Testament. By the Rev. Dr. Thornton, V.P.
18. On Spontaneous Generation; or, the Problem of Life. By the Rev. Prof. Kirk.
A Demonstration of the Existence of God. By the Rev. J. M'Cann, D.D.
Why Man must Believe in God. By the late James Reddie, Esq., Hon. Sec. V.I.
19. On Geological Proofs of Divine Action. By S. R. Pattison, Esq., F.G.S.
On True Anthropology. By W. Hitchman, Esq., M.D.
On Comparative Psychology. (Second Paper.) By E. J. Morshead, Esq. Hon. For. Sec. V.I.
20. On the High Numbers in the Pentateuch. By P. H. Gosse, Esq., F.R.S., V.P.
Israel in Egypt. By the late Rev. H. Moule, M.A.

SECOND SERIES.

VOL. VI.

21. On Civilisation, Moral and Material. (Also in Reply to Sir John Lubbock on "Primitive Man.") By the late J. Reddie, Esq., Hon. Sec. V.I. (1869–70.)
On Dr. Newman's "Essay in Aid of a Grammar of Assent." By the Rev. Preb. Row, M.A.
22. On the Evidence of the Egyptian Monuments to the Sojourn of Israel in Egypt. By the Rev. B. W. Savile, M.A.
On the Moabite Stone, by Captain F. Petrie, Hon. Sec.
On Phyllotaxis; or, the Arrangement of Leaves in Accordance with Mathematical Laws. By the Rev. G. Henslow, M.A., F.L.S.
On Prehistoric Monotheism, considered in relation to Man as an Aboriginal Savage. By the Right Rev. Bishop Titcomb, D.D. (1871–72.)
23. On Biblical Pneumatology and Psychology. By the Rev. W. W. English, M.A.
On Some Scriptural Aspects of Man's Tripartite Nature. By the Rev. C. Graham.
On Ethnic Testimonies to the Pentateuch. By the Right Rev. Bishop Titcomb, D.D.
24. On the Darwinian Theory. By the Rev. Prebendary Irons, D.D.
Serpent Myths of Ancient Egypt. By the late W. R. Cooper, Esq., F.R.A.S., M.R.A.S., Sec. Soc. Biblical Archæology, 129 Illustrations.

VOL. VII.

25. On Natural Theology, considered with respect to Modern Philosophy. By the Rev. G. Henslow, M.A., F.L.S.
On Fatalism. Contributed by the Rev. J. Robbins, D.D.
26. On Darwinism Tested by Recent Researches in Language. By F. Bateman, Esq., M.D., &c.
On Force and its Manifestations. By the Rev. J. M'Cann, D.D.
On Professor Tyndall's "Fragments of Science for Unscientific People." By the Rev. Prebendary Irons, D.D.
On the Origin of the Moral Sense. By the Rev. Professor Kirk.
On Force and Energy. By the late Charles Brooke, Esq., M.A., F.R.S., V.P.
27. On Darwinism and its Effects upon Religious Thought. By C. R. Bree, Esq., M.D., &c.
Remarks on some of the Current Principles of Historic Criticism. By Rev. Preb. Row, M.A.
On "Scientific Facts and Christian Evidence." By J. Eliot Howard, Esq., F.R.S., F.L.S.
28. On the "Law of Creation—Unity of Plan, Variety of Form." By Rev. G. W. Weldon, M.A.
Some Remarks on the Present Aspect of Enquiries as to the Introduction of Genera and Species in Geological Time. By Principal J. W. Dawson, C.M.G., LL.D., F.R.S.

VOL. VIII.

29. The Palæolithic Age Examined. By N. Whitley, Esq.
(Annual Address.) On the Moral and Social Anarchy of Modern Unbelief. By the Rev. Principal T. P. Boultbee, LL.D., Vice-President.
30. On the Identity of Reason in Science and Religion. Rev. R. Mitchell.
On Buddhism. By the Right Rev. Bishop Piers C. Claughton, D.D., &c., with communications from Professors Chandler and Brewer.
On the Contrast between Crystallisation and Life. By John Eliot Howard, Esq., F.R.S.
31. On the Brixham Cavern and its Testimony to the Antiquity of Man—examined. By N. Whitley, Esq., Sec. Royal Inst. of Cornwall.
On the Rules of Evidence as applicable to the Credibility of History. By W. Forsyth, Esq., Q.C., LL.D. Vice-President.
On the Principles of Modern Pantheistic and Atheistic Philosophy as expressed in the last work of Strauss, Mill, &c. By the Rev. Prebendary C. A. Row, M.A. Paper on the same, by Professor Challis, M.A., F.R.S., F.R.A.S.
32. On "Prehistoric Traditions and Customs in Connexion with Sun and Serpent Worship." J. S. Phené, Esq., LL.D., F.S.A., with Illustrations. (1872-73.)

VOL. IX.

33. On the Varying Tactics of Scepticism. (Annual Address.) By the Rev. Robinson Thornton, D.D., Vice-President.
On the Harmony between the Chronology of Egypt and the Bible. By the Rev. B. W. Savile, M.A.
On the Ethical Condition of the Early Scandinavian Peoples. By E. W. Gosse, Esq.
34. On Magnitudes in Creation and their Bearings on Biblical Interpretation. By the Right Rev. Bishop Titcomb, D.D. Paper on the same, by Professor Challis, M.A., F.R.S., F.R.A.S.; with communications from the Astronomer Royal's Department, the Radcliffe Observer, and Professor Pritchard, F.R.S.
On Biblical Interpretation in connexion with Science. By the Rev. A. I. McCaul, M.A. (King's College), with a communication by Principal J. W. Dawson, C.M.G., LL.D., F.R.S.
On the Final Cause as Principle of Cognition and Principle in Nature. By Professor G. S. Morris, of Baltimore University, U.S.
35. On the Bearing of certain Palæontological Facts upon the Darwinian Theory of the Origin of Species, and of Evolution in General. By Professor H. A. Nicholson, M.D., D.Sc., F.R.S.E., &c.
On the Early Dawn of Civilisation, considered in the Light of Scripture. By J. E. Howard, Esq., F.R.S.
On the Indestructibility of Force. By the Rev. Professor Birks, M.A.
36. On Mr. Mill's Essays on Theism. By Rev. Preb. W. J. Irons, D.D.

VOL. X.

37. On the Chronology of Recent Geology. By S. R. Pattison, Esq., F.G.S.
On the Nature and Character of Evidence for Scientific Purposes. By the Rev. J. M'Cann, D.D.
The Relation of the Scripture Account of the Deluge to Physical Science. By Professor Challis, M.A., F.R.S., F.R.A.S.

38. An Examination of the Belfast Address from a Scientific point of view. By J. E. HOWARD, Esq., F.R.S.
Annual Address: Modern Philosophic Scepticism examined. By the late Rev. R. MAIN, F.R.S., V.P.R.A.S., *The Radcliffe Observer.*
On the Etruscan Language. By the Rev. ISAAC TAYLOR, M.A.
39. On "Present Day Materialism." By the Rev. J. McDOUGALL.
On the Sorrows of Scepticism. By Rev. R. THORNTON, D.D., Vice-Pres. (*see* parts 6, 15, 33).
On Heathen Cosmogonies, compared with the Hebrew. By Rev. B. W. SAVILE, M.A.
On the Place of Science in Education. By Professor H. A. NICHOLSON, M.D., D.Sc., F.R.S.E.
40. On Egypt and the Bible. By J. E. HOWARD, Esq., F.R.S.

VOL. XI.

41. The Flint "Implements" of Brixham Cavern. By N. WHITLEY, Esq. (*Photographically illustrated.*)
On the Flint Agricultural Implements of America. By Dr. J. W. DAWSON, C.M.G., F.R.S.
An Examination of "The Unseen Universe." Rev. Preb. IRONS, D.D.
The Uncertainties of Modern Physical Science. By Professor BIRKS, M.A.
The Ethics of Belief. By Professor H. WACE, M.A. (1876-7.)
42. On the Metaphysics of Scripture. By Professor CHALLIS, M.A., F.R.S., F.R.A.S.
On the Theory of Unconscious Intelligence as opposed to Theism. By Prof. MORRIS, U.S.A.
On the Myth of Ra. By the late W. R. COOPER, Esq., F.R.A.S., Sec. Soc. Bib. Arch.
On Christianity as a Moral Power. By Professor LIAS, St. David's College, Lampeter.
43. On the Structure of Geological Formations as Evidence of Design. By D. HOWARD, F.C.S.
On the Bible and Modern Astronomy. By Prof. BIRKS, M.A. (Camb.).
44. On Comparative Psychology. By E. J. MORSHEAD, Esq.

VOL. XII.

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